

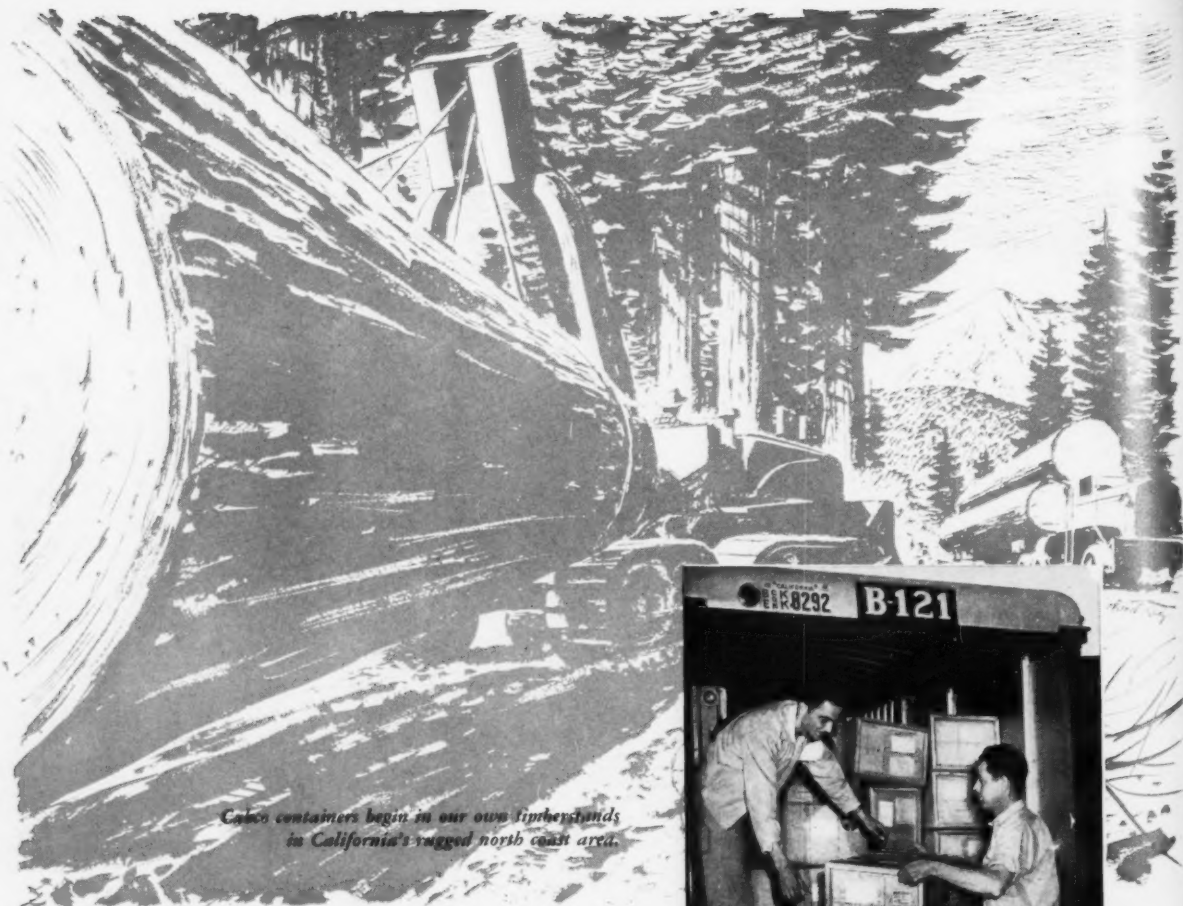
WESTERN INDUSTRY



COUNT HIM IN AT THE
PLANNING STAGE

MATERIALS HANDLING ISSUE

AUGUST 1952



*Cabco containers begin in our own timberlands
in California's rugged north coast area.*

You get more from **CABCO**

**...the West's foremost designer and manufacturer
of wooden shipping containers**

Shipping containers of a given type must be uniform in size, strength and lightness. Cabco goes to great lengths to give you uniformity. Our own stands of fine Douglas Fir timber give a steady supply of uniform raw materials. Every logging and manufacturing step is under our supervision. And we constantly study, check and test—to be sure Cabco containers are consistent in quality, durability and dependability.

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DELICATE ELECTRONIC TEST INSTRUMENTS

ship Cabco, too. Hewlett-Packard Co., leading electronic measuring instrument manufacturer, ships both domestic and overseas orders in Cabco wirebounds. Important weight savings are achieved, and containers are often re-used for onward routing of instruments.

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A product of the California Barrel Company, Ltd.

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Pacific-Western Reducers are SERVICE-RATED

Service-Rating means that skilled Pacific-Western application engineers carefully assist you in selecting the *right* reducer for the job you want done. The rating of the reducer will meet your service requirements with an adequate margin of safety. No pampering required.

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WESTERN INDUSTRY



VOLUME XVII

AUGUST • 1952

NUMBER 8

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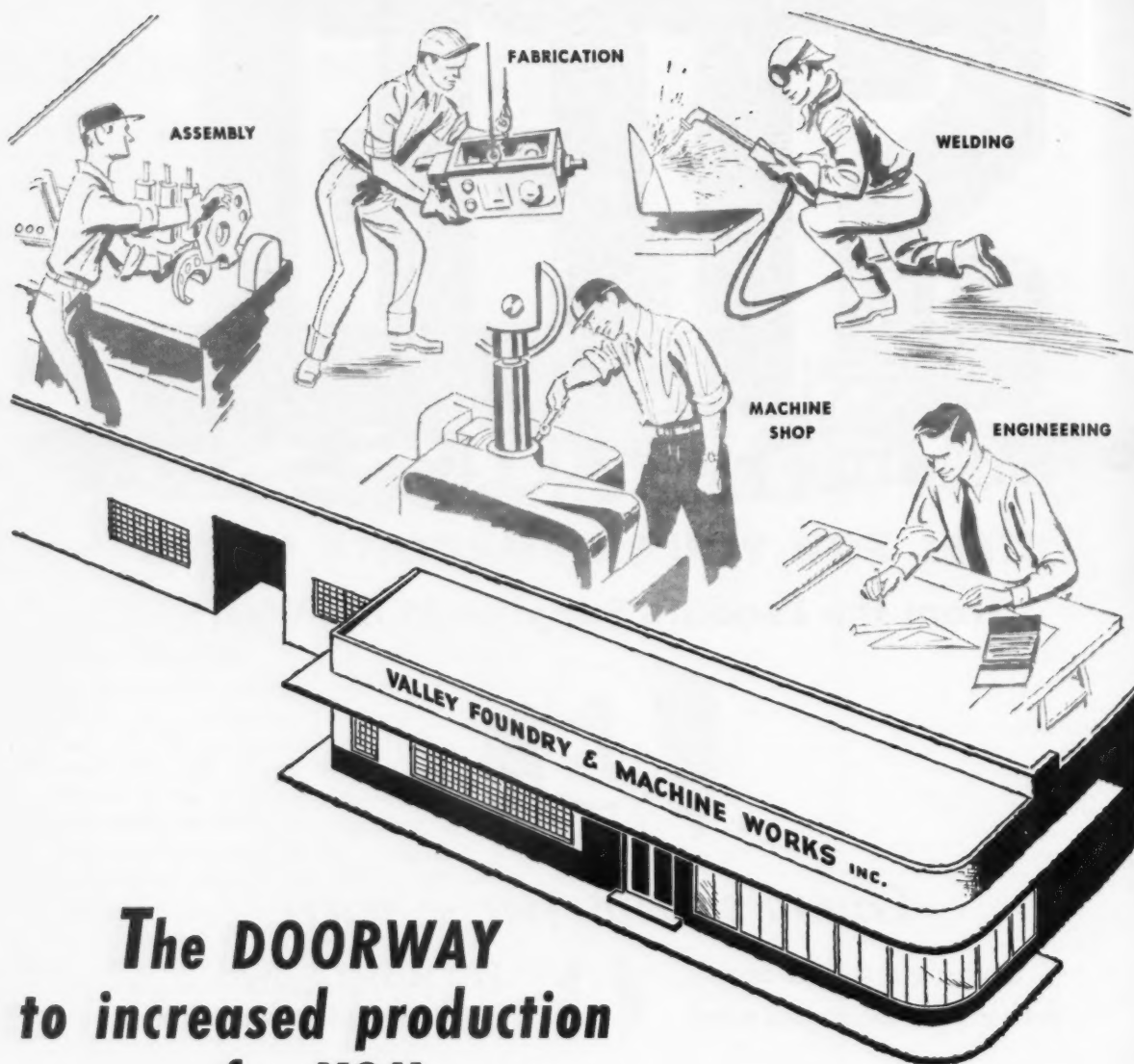
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"John, this building of mine holds a

cost-cutting

Tip-Off

from ONE BUSINESSMAN TO ANOTHER"

"What is it?" asked John, a prominent appliance manufacturer.

The contractor answered, "Simply this: don't take your fasteners for granted!"

"An RB&W man showed me how a switch in fasteners could help me make field connections much more economically.

"He suggested switching from rivets to high strength bolts. They cost more than rivets initially, but the assembled cost is much lower. My men work faster than with rivets. The building goes up faster."

You, too, can find a cost-cutting lesson from this story, whether you're in construction* or any other industry.

MORAL: Look to your fasteners for an often overlooked opportunity to reduce costs, and strengthen your competitive position. New inventions, like RB&W's SPIN-LOCK

Screw, may prove more efficient than the fasteners you're now using. Or you may save by the stepped-up production you get from using the finest fasteners . . . RB&W bolts, screws, nuts and rivets of uniform accuracy, dependability and physical properties.

Let RB&W help you make the most efficient use of fasteners on your assembly line. Address RB&W, West Coast Plant, 4466 Worth St., Los Angeles, Calif.

RB&W serves Western industry with the complete quality line. Other plants: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. Additional sales offices: Oakland, Dallas, Chicago, Detroit, Philadelphia, Pittsburgh. Sales agents: Portland, Seattle. Distributors from coast to coast.

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*If you're interested in construction, write RB&W at Port Chester for a free reprint of the recent article, "No More Riveting."

RB & W 107 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG



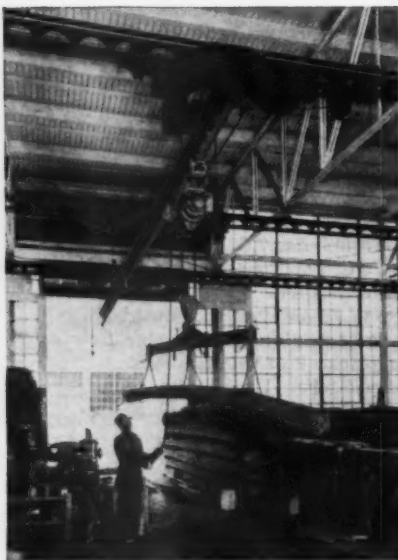
PETERSON TRACTOR AND EQUIPMENT CO., SAN LEANDRO, CALIF., is saving about 15% of time required for

complete overhaul on Caterpillar equipment with four 3-ton 50 foot motorized Cleveland Tramrail cranes.

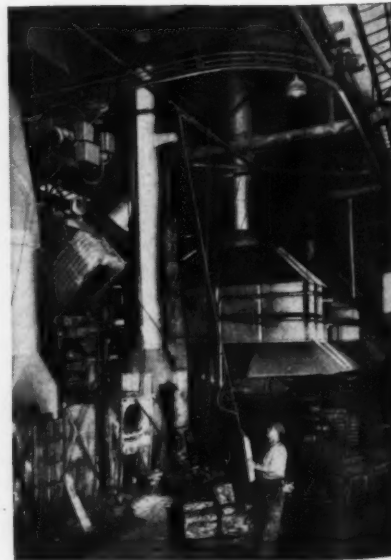
CLEVELAND TRAMRAIL SERVES



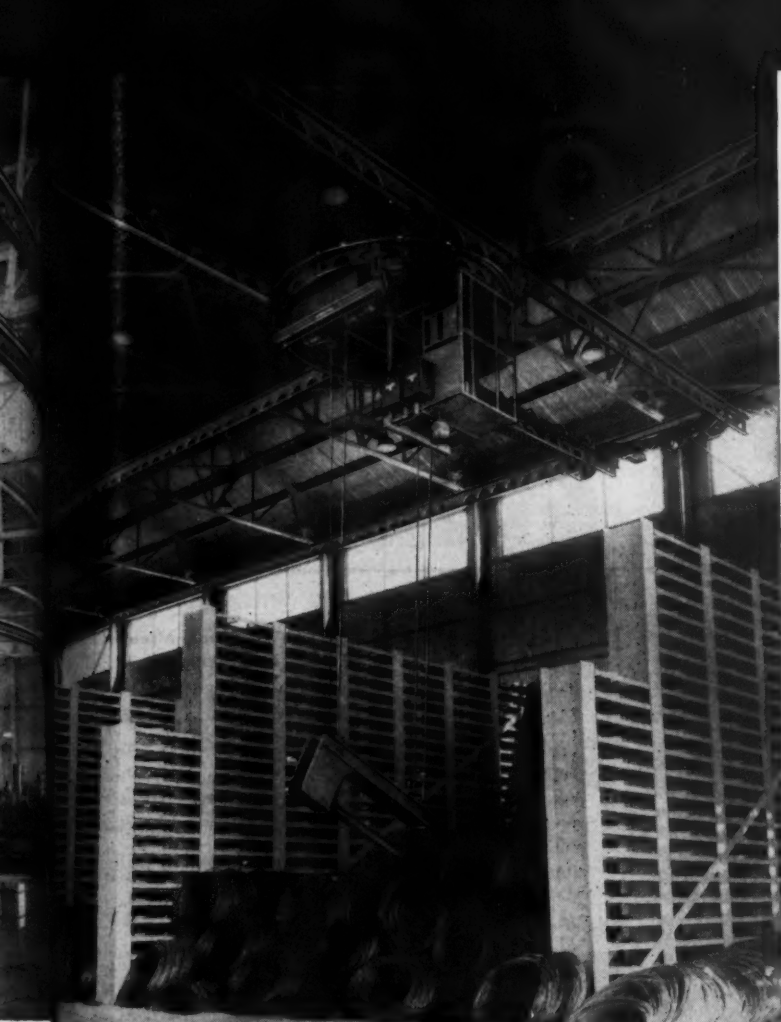
REFRIGERATION ENGINEERING, INC., LOS ANGELES, solved the problem of handling high condensers under a low roof by this special high-lift 3-ton crane. Distance floor to truss 11' 10". High position hoist hook 10' 0" above floor.



KORTICK MANUFACTURING CO., SAN FRANCISCO, saves \$5000 yearly on steel purchase cost and cuts unloading time 2 hours per car with a 5-ton 50-ft. span motorized transfer crane. Shown interlocked with track extending through doorway over railroad.



FEDERATED METALS DIVISION, AMERICAN SMELTING AND REFINING COMPANY, SAN FRANCISCO, charges a melting furnace with a motor-driven Tramrail carrier. Tote boxes are hoisted and emptied by two individually operated hoists.



A LOS ANGELES WIRE MILL picks up 3500 lbs. of rod at a time with a tilting hook that can be hoisted, lowered and rotated 360° with a 76 foot crane.

THE WEST

SPEEDS PRODUCTION — SAVES FLOOR SPACE — IMPROVES SAFETY — REDUCES FLOOR CONGESTION — CUTS COSTS

From Mexico to well above the Canadian line the West is dotted with hundreds of varied installations of Cleveland Tramrail overhead materials handling equipment serving nearly every type of industry. Many of these installations have been in continuous service for over 25 years.

Cleveland Tramrail consists of track, switches, carriers, cranes, hoists, grabs, etc. which can be combined in a thousand-fold ways to exactly suit your need. As illustrated, it can be assembled into all variations from simple manually or electrically powered, floor-controlled equipment to cab-operated and automatic plant-wide systems.

You will be amazed how fast Tramrail equipment pays for itself and at the many advantages it provides. Any of the WESTERN REPRESENTATIVES LISTED BELOW will be glad to show you nearby installations. Why not make an appointment now and get first-hand information from unbiased users? No obligation, of course.

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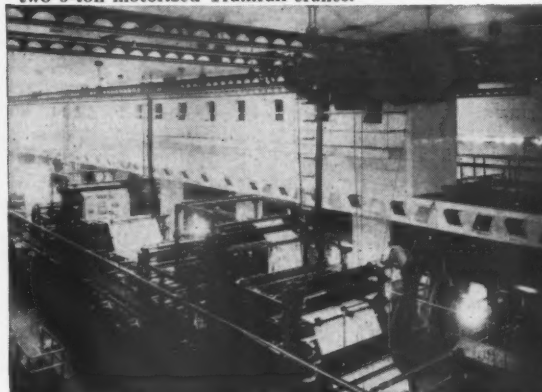
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THE COLD METAL PRODUCTS COMPANY OF CALIFORNIA, LOS ANGELES, stores more steel strip in their warehouse, reaches any coil quickly and reduces damage from dents to the highly finished metal by use of two 6-ton motorized Tramrail cranes.



THE LOS ANGELES TIMES has been saving time for 15 years with an overhead Cleveland Tramrail crane system. The equipment is used for handling printing rolls and press parts when making repairs.



LOCKHEED AIRCRAFT CORPORATION, BURBANK, CALIF., has been handling giant aircraft and aircraft sections for many years with overhead cab-operated Tramrail cranes.

CLEVELAND



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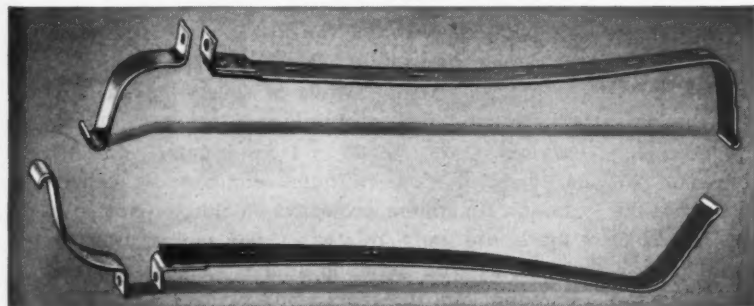
WISCONSIN
Milwaukee—Steel Sales Corporation

Acme Steel Stitching Insures S.A. *(Strong Assembly)*

Fastening felt-to-steel with Acme Steel Metal Stitcher saves time, money, materials, too, on Willys-Overland Jeep production



FLYING HIGH! Jeeps are built to take almost any kind of beating . . . and that's one reason Willys-Overland assembles Jeep gas-tank straps with Acme Steel Metal Stitchers.



FIVE CENTS SAVED PER STRAP—that's the saving Willys-Overland made when they switched to Acme Steel metal stitching. Here on the finished gas-tank straps, you can see the neat, strong, money-saving steel stitches.

You might think Acme Steel metal stitching doesn't apply to your product. But if you have any assemblies of steel, brass, copper or aluminum fastened to each other or to wood, felt, cork, canvas, leather, rubber, fibre, plastic, asbestos or the like—you name it—chances are Acme Steel can help you cut costs and speed production at the same time!

Ask your Acme Steel representative, or write to Acme Steel Products Division, Dept. No. WI 82.

ACME STEEL COMPANY

4901 Pacific Boulevard, Los Angeles 58, Calif.



PRODUCTION BOOSTED BY STITCHING FELT TO STEEL. This Acme Steel Metal Stitcher assembles Jeep gas-tank straps by stitching asphalt-saturated felt to 18-gage (0.0475 inch) steel strap, and it takes just 1/5 of a second per stitch—far faster than other assembly methods. It boosted production for Willys-Overland to 300 units per hour.





Republic Rubber Packing catches pellets that wear out iron

The rotating table of this Roto-Blast machine moves through a tunnel of storm where high-speed impellers hurl down a rain of metal pellets that knock rough edges off new-made castings.

The table top is made of a special alloy, cast hard and tough. But without protection it can't very long resist the stinging fury of the metal hailstones.

The answer is Republic Rubber Sheet Packing . . . a special, soft, perforated, 7/16-inch-thick pad of solid Republic Rubber Packing that catches the pellets and protects the table top from impact at the storm center . . . and a cloth-insert rubber-surfaced curtain that confines the ricocheting pellets to the blast area and thereby protects workmen against eye and other injuries.

Large foundries and machine companies use

Republic Rubber Packing on both these jobs of protecting workmen and machines. They use Republic Packing because it lasts longer, is easier to handle and because it's supplied through local Republic Distributors who give fast, expert service.

Republic's Rubber Packing, supplied in all standard gauges in rolls or sheets, has a thousand and one industrial applications that you should know about . . . diaphragms, gaskets, cushion blocks, vibration dampeners, sealers, trough containers, protective shields, silencers . . . these are only a few of the many uses for economy-wise Republic Rubber Packing, **made of material that outwears steel.**

Republic Rubber Packing is in stock at your local Republic Distributor. Ask him about it today or write direct for complete information.



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— QUICKER APPLICATION — OF SPEED,
DIRECTION, BRAKE, LIFTING AND
LOWERING.

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ALL I DO IS
PRESS THE
HANDLE "TRIGGER"
ALL THE WAY AND
SPEED PICKS UP INSTANTLY AND
SMOOTHLY WITH NO JERKS OR JOLTS.
THE SPECIAL TIMING DEVICE ELIMINATES
MY HAVING TO "SHIFT" THROUGH
EACH SPEED.

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WE SAVE
6" TO 9" OF
AISLE SPACE WITH THE JACKLIFT ELECTRIC
TRUCK. HOW? SIMPLY BECAUSE ALL CONTROLS
OPERATE WITH THE HANDLE IN THE
VERTICAL POSITION. TRY IT . . .
YOU'LL SEE HOW IMPORTANT
THIS FEATURE IS.

ELECTRIC DEADMAN TYPE BRAKES

I SIMPLY
RELEASE MY HAND PRESSURE ON
THE HANDLE "TRIGGER" AND GET
INSTANT, CUSHIONED BRAKING.
IT'S QUICKER AND SAFER . . . THE BRAKE
OPERATES WITH HANDLE IN ANY
POSITION.



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Company _____

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Simple Procedure Change Licks Pin Holing

Porosity in horizontal fillet welds was occurring on heavy bases for diesel engines being manufactured by a large locomotive builder. Various makes of electrodes were tried with no improvement.

Metal & Thermit's local sales engineer was asked to investigate . . . quickly uncovered that the plate being used in certain portions of the weldment was off in chemical content. By positioning for flat welding, or, where this could not be done, by using Murex low-hydrogen electrodes, pin holing was completely stopped—production resumed—and parts already fabricated were completed instead of scrapped.

MUREX[®]

Electrodes

Arc Welders • Accessories

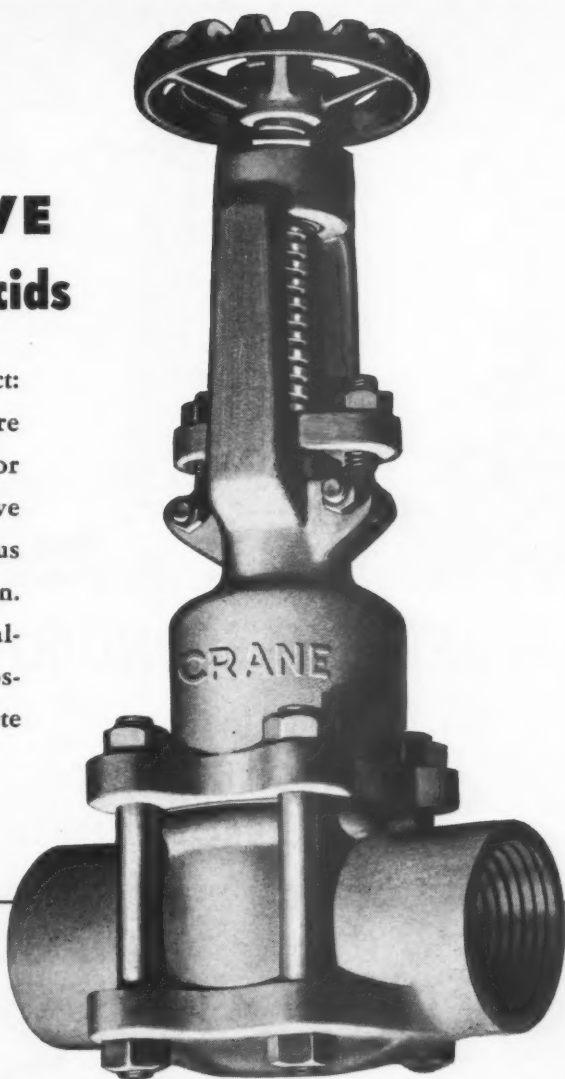
Your nearby M&T representative is qualified to give genuine assistance on any welding problem. Call on him when you need help. Make use of his broad background of experience in every phase of welding.



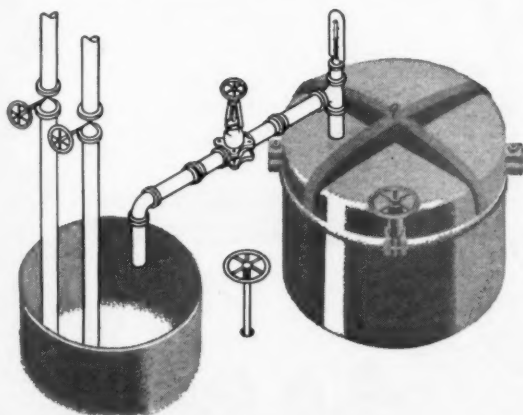
METAL & THERMIT CORPORATION 100 East 42nd Street, New York 17, N. Y.

This CRANE VALVE tamed troublesome acids

This case demonstrates an old fact: Valve costs in handling any fluid are related directly to valve suitability for the service. Here, a highly corrosive acid process played havoc with various valves until tamed with a Crane design. Proper selection plus dependable quality made this valve performance possible. You get both in the complete Crane line.



Read these Facts of the Case!



Where Installed: In a yarn dye works, in piping to a package dyeing machine. **Fluids handled:** Various acid dye solutions at temperatures from 50 to 210 degrees F.

Trouble Encountered: Previously tried valves and cocks couldn't stand the combined effects of frequent operation, throttling, and the severely corrosive acids. They leaked badly; wouldn't operate. They needed constant repair, lasting 1 to 2 months at best.

Solution and Result: Replacement made with Crane 18-8 Mo Stainless Steel Plug Gate Valve. After more than 3 years' service, customer reports: No leakage trouble . . . no sign of corrosion . . . always easy to operate . . . no valve maintenance expense.

More **CRANE VALVES**
are used than any other make

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VALVES • FITTINGS • PIPE • PLUMBING • HEATING

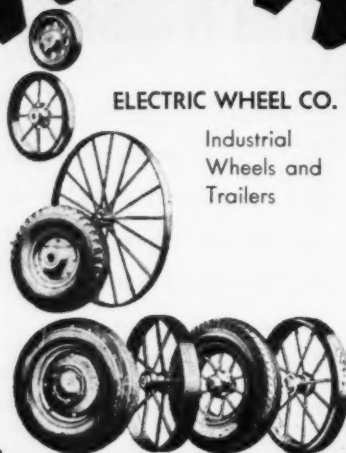
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Industrial Trucks
Gas & Electric Driven



ELECTRIC WHEEL CO.

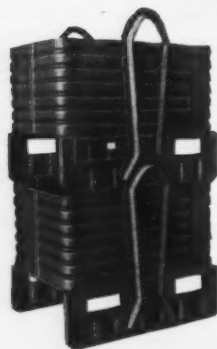
Industrial
Wheels and
Trailers



GEARED TO ECONOMY
MASS HANDLING
SYNCHRONIZED WITH
MASS PRODUCTION

POWELL

Pressed Steel
Boxes, Skids
and Pallets



REVOLVATOR

Power Lifttrucks,
Hand Lifttrucks
and Portable
Elevators



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IRA G. PERIN CO.

Material Handling Equipment

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HUNTINGTON PARK

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Agents
like*
TAYLOR LAMINATED PLASTICS
because...



*In the
television
industry...*

Extremely good electrical properties combined with low moisture-absorption qualities make Taylor Laminated Plastics ideal for parts in fly-back transformers, deflection yokes and many others. How can these basic materials serve you?



"This is Taylor Fibre Co." is a 24-page booklet that literally brings the entire Taylor organization to your fingertips. It describes how the many Taylor Laminated Plastics are made, how and where they're used, and more important, how you can use these basic materials to make your product better... at lower cost! Write today for a copy of Booklet W18.

...they make purchasing problems easier to solve. Taylor Phenol, Melamine and Silicone Laminates are uniformly dependable materials that are made to rigidly-held specifications. Design and production men like them.

...they are priced right, and are made in an almost limitless range of forms, weights, grades and sizes.

...they are nearly always available from stock, or on short delivery. When you buy Taylor Laminated Plastics you are assured of getting the right materials when needed.

...the completeness of the Taylor line makes it possible for the purchasing agent to buy many items from one supplier with the obvious advantages.

Make it a point to get in touch with a Taylor sales engineer when you need laminated plastics. Drop us a line today to get the facts on these versatile Taylor materials... including Taylor Vulcanized Fibre and Taylor Insulation.



TAYLOR FIBRE CO.
LA VERNE, CALIF. • NORRISTOWN, PA.

VULCANIZED FIBRE • TAYLOR INSULATION

PHENOL, SILICONE & MELAMINE LAMINATES • FABRICATED PARTS

shapes

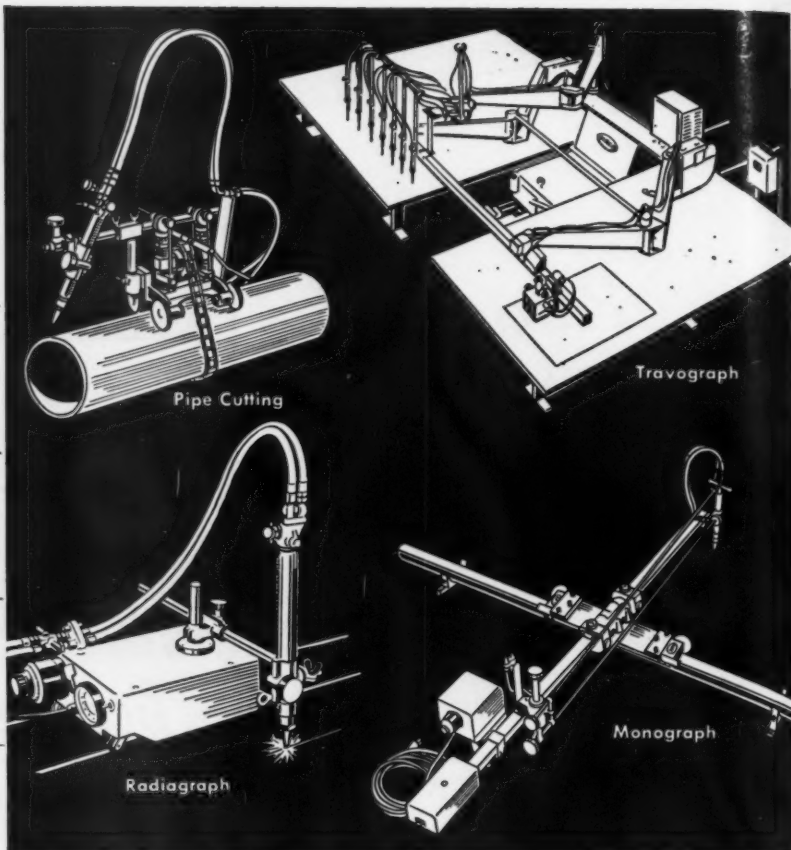
**straight
cutting**

circles

beveling

grooves

squaring



**AIRCO
gas cutting
machines**

**MACHINE GAS CUTTING
FOR PRECISION PRODUCTION**

In fabrication shops, steel mills or warehouses, wherever the oxy-acetylene flame is used, Airco has the right gas cutting machine for the job.

Radiograph—easy to operate, portable, for straight line and circular cutting.

Travograph—precision shapes up to 102" x 144" — circles 144" — straight line cuts any desired length.

Monograph—portable, shape cutting, area 32" x 56".

Pipe Cutting and Beveling — cuts and bevels in one operation up to 30" pipe.

Airco gas cutting machines are produced in a wide range of portable and stationary types and sizes. Designed for single or multiple torch operation to meet the need of industry from the smallest metal working shop to the largest fabrication plants. Ruggedly constructed, their excellent operating characteristics assure trouble-free life under the heaviest service loads.

For your free copies of descriptive booklets about Airco gas cutting machines, A—Radiograph, B—Travograph, C—Monograph, D—Pipe Cutting and Beveling, see your Airco distributor or write to Air Reduction Pacific Company, Adv. Dept., San Francisco 3, Calif.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND



AIR REDUCTION PACIFIC COMPANY

A Division of Air Reduction Company, Incorporated

**SAN DIEGO • SAN FRANCISCO • LOS ANGELES • PORTLAND • SEATTLE
Bakersfield • Fresno • Emeryville • Sacramento • Tacoma**

Western Headquarters for Oxygen, Acetylene and Other Gases . . . Carbide . . . Gas Welding and Cutting Machines, Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

WHITE 3000's "SPECIALIZED DESIGN"



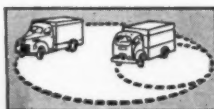
earns more



costs less

THROUGH THE YEARS!

Efficient truck transportation holds the key to profitable delivery. When you employ the advantages of the White 3000 SPECIALIZED DESIGN . . . more payload, faster loading and unloading, higher efficiency in traffic and lower maintenance costs . . . you *minimize* delivery expense and realize a higher margin of profit, year after year. Let your local White Representative prove how the economies of White's Specialized Design can work for you. Call him today!



Greater Maneuverability



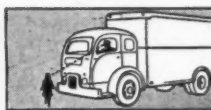
More Payload...Shorter Length



New Cab Saves Driver Time



More Efficient In Traffic



Better Visibility...Safety



Low Loading Height

THE WHITE MOTOR COMPANY

CLEVELAND 1, OHIO

Factory Branches, Distributors & Dealers Everywhere

Tips its cab to service



FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

August, 1952 — WESTERN INDUSTRY

What do you do when you don't have the right size v-belt in stock?

1

Contact your supplier for a replacement

...and wait for delivery
...wait—and watch production stay at zero



3

Stock **VEELOS**...

2



Send someone to get the required belt

...and pay your employee while he goes for the belt
...pay through loss of production



GET ALL THE FACTS



This Veelos Data Book gives complete details about construction, installation and uses. Write for free copy of this money-saving book today.

MANHEIM MANUFACTURING & BELTING COMPANY
615 Manbel St., Manheim, Pa.

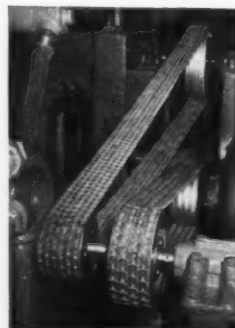
- ...and always have the right size belt when you need it
- ...any length can be made up from a 100-foot reel
- ...inventory is automatically maintained
- ...available from 350 distributors

VEELOS in stock is Production Insurance

Belts for replacement always on hand—just 4 reels of Veelos in the O, A, B and C widths can replace up to 316 different sizes of endless v-belts.

Link construction permits quick installation—without removing outboard bearings.

Adjustability provides controlled tension on each belt—vibrationless, full power delivery is assured.



ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

STANDARD ENGINEER'S REPORT

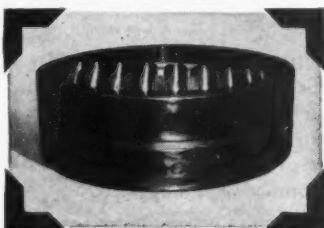
LUBRICANT	DATA <i>Calol E.P. Roller Grease</i>
UNIT	<i>16" x 44" roll neck bearing</i>
CONDITIONS	<i>Temp. to 140°F — extreme pressures</i>
PERIOD	<i>875 hours</i>
FIRM	<i>Kaiser Aluminum & Chemical Corp., Spokane, Wash.</i>

Grease retains "body" after 875 hours in rolling mill bearing



CALOL EP ROLLER GREASE-1X, in this big roll neck bearing and chuck, was sealed around the bearing during 875 hours of service in a "hot" rolling mill. No grease leaked from the chuck during operation in

THE 2800-POUND BEARING shows no wear on either the rollers or race. There was no sign of corrosion in the chuck and neoprene seals were perfect. After cleaning the unit was re-assembled, refilled with 125 pounds of CALOL EP Roller Grease-1X, and put back in service.



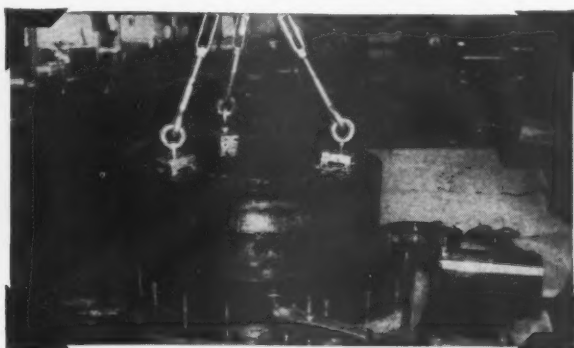
REMARKS: The Kaiser Rolling Mill at Spokane, Washington, produces sheet and coil aluminum. Roll neck bearings in the mill have been lubricated with CALOL EP Roller Grease since 1946. Made from highly specialized stocks, this grease will solve many of your anti-friction and plain bearing lubrication difficulties where extreme pressures, high temperatures or water conditions present problems too great for conventional greases.



FREE CATALOG: "How to Save Money on Equipment Operation," a new booklet full of valuable information, is ready for you. Write or ask for your free copy today.

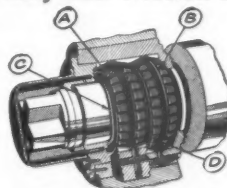


TRADEMARK "CALOL" REG. U.S. PAT. OFF.



temperatures up to 140°F. The grease retains high lubricating qualities—is being changed only because it is practice to remove and service the bearings at intervals of approximately 1000 hours.

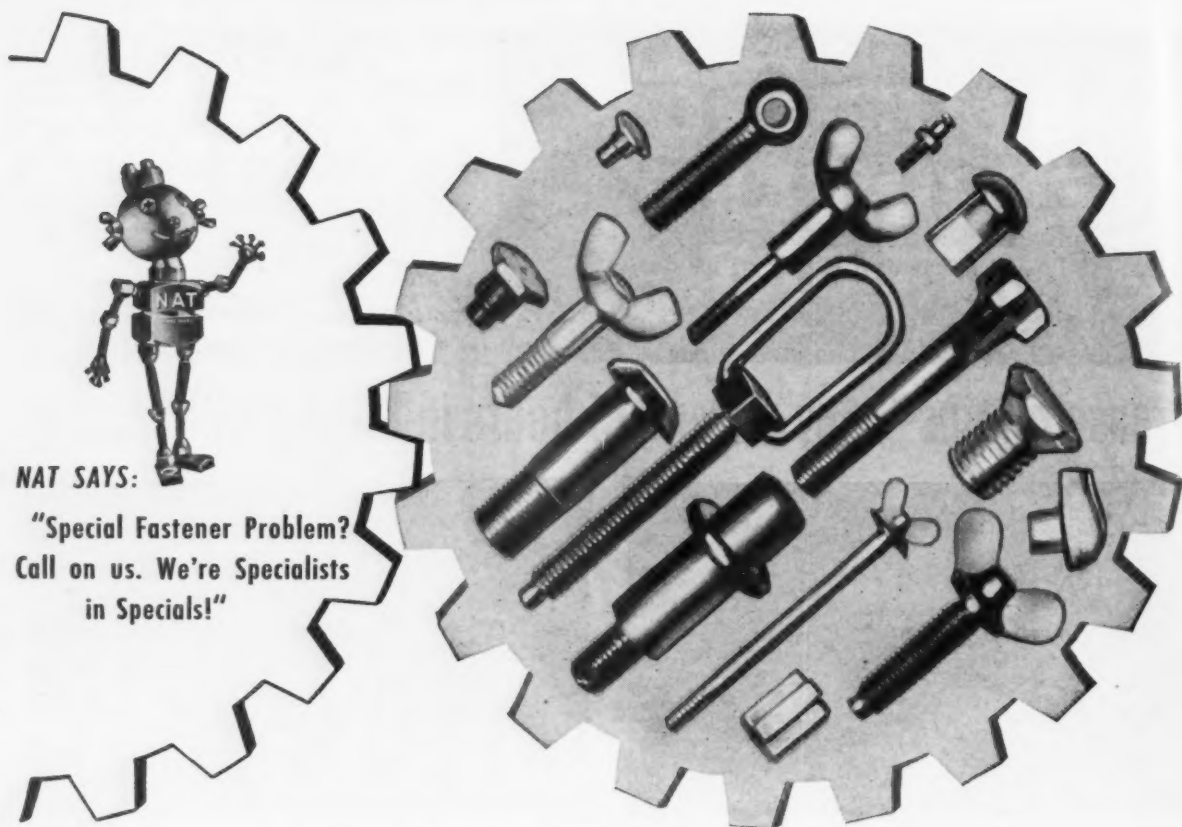
How CALOL EP Roller Grease protects heavy-duty anti-friction bearing



- A. Contains extreme pressure additives—lubricating film will not squeeze off under heaviest loads.
- B. Highly water-resistant—sticks on bearings even where excessive water used for cooling.
- C. Feeds slowly and evenly—creeps into small clearances and assures good lubrication. Pumps easily at low temperatures.
- D. Will not corrode metal or harm neoprene and plastic seals.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA



NAT SAYS:

"Special Fastener Problem?
Call on us. We're Specialists
in Specials!"

NAT's really geared for your "Specials"

When you need special fasteners or small parts in volume, National's "Special Products Service" can save you time, headaches and money. We've done it for hundreds and hundreds of customers, and we can probably do it for you—tell you how your part can be adapted to our methods of production, and produce it for you in the volume you need, economically and speedily.

With some 3500 producing units, from cold-heading equipment to many types for secondary operation, we offer you facilities second to none for efficient and expert handling of your "Special" requirements. Send us your specifications or call your nearest National representative.

Remember NAT, too, when you need standard fasteners or specialties like lock nuts or self-locking bolts and screws. National produces the most complete line of fasteners for industry made by any one manufacturer in the U. S. A.

Representatives in Chicago, Cincinnati, Detroit, New York, Philadelphia, Kansas City, San Francisco, Denver and Seattle
—write or call direct to:

NATIONAL SCREW & MFG. CO. OF CAL.

3423 So. Garfield Ave., Los Angeles 22, Cal.

Div. of The National Screw & Mfg. Company, Cleveland 4, Ohio



FASTENERS



HODELL CHAINS



CHESTER HOISTS



Build Faster... at Lower Cost with BUTLER Buildings

(Steel or Aluminum)



Weathertight storage for 15,000 tons of sacked ammonium nitrate fertilizer is provided for chemical company by these 12 Butler Buildings at Military, Kansas.

Choose Butler Steel Buildings for fast expansion of existing facilities or new building construction.

Butler Buildings offer:

- (1) Lower initial cost . . . save up to 50 per cent of the cost of other conventional construction.
- (2) Easy erection with less labor.
- (3) Early occupancy . . . ready for use in days instead of weeks.
- (4) Long-life, bolted construction.
- (5) Fire-safety . . . low insurance rates.
- (6) Weathertight construction.
- (7) Adaptability to practically any industrial need.
- (8) Low maintenance.
- (9) Wide range of sizes.

Butler Buildings are made at our Richmond, California, plant for convenient delivery to West Coast industry . . . and have been proved in use for more than 40 years. See your Butler dealer, or mail coupon below today.



**BUTLER MANUFACTURING
COMPANY**

KANSAS CITY, MISSOURI
Galesburg, Illinois
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Straight Sidewalls . . . Use All the Space You Pay For

For prompt reply, address

BUTLER MANUFACTURING COMPANY

Dept. 72A, Richmond, California

☐ Send full information about Butler Buildings, for use

as

☐ Send name of my nearest Butler dealer.

Name _____

Firm _____

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Zone _____ State _____



Fence, barbed wire, sheets . . . tractors, ploughs, harvesters—modern farms need these and many other items of steel to produce the food you eat. In 1951, Western farmers bought more than 100,000 tons of steel—enough to build 57,000 automobiles.

It takes lots of steel to raise your food!

Western farms used 100,000 tons of steel last year

One of the main reasons we Americans eat so well is steel . . . for it takes lots of steel to maintain our huge farm production: steel for machines and implements; steel for shelter and storage; steel for dozens and dozens of accessories. This year, Western farm

consumption of steel will likely exceed the more than 100,000 tons used in 1951. Largest source of this steel will be Columbia-Geneva Steel Division, Western producing member of the industrial family that serves the nation—United States Steel.

West's largest source of steel



Columbia-Geneva Steel Division

United States Steel Company



UNITED STATES STEEL

AN IMPORTANT ANNOUNCEMENT

Manufacturers in the important industrial areas served by Pacific Metals Company, Ltd., will be pleased to learn that this outstanding organization has assumed the distribution of Silvaloy Silver Brazing Alloys and APW Fluxes.

PACIFIC METALS COMPANY, LTD.

DISTRIBUTORS FOR

SILVALOY

LOW TEMPERATURE SILVER BRAZING ALLOYS

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SALES • TECHNICAL SERVICE • QUOTATIONS

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	SILVER CONTENT	MELTING POINT	FLOW POINT
SILVALOY 18	15%	1185°F	1280°F
SILVALOY 20	20%	1430°F	1500°F
SILVALOY 25	35%	1125°F	1295°F
SILVALOY 45	45%	1125°F	1145°F
SILVALOY 58	50%	1160°F	1175°F
SILVALOY 58S	50%	1195°F	1270°F

We are pleased to have Silvaloy users gain the many added service advantages assured by the extensive facilities, experience and known reliability of the Pacific Metals Company, Ltd. organization.

They will supply Silvaloy Brazing Alloys in the wire, coil or preformed shape most convenient and economical for your production. Data on Silvaloy Plymetal and brazing alloys for special purposes will be furnished at once upon request.

Experienced Silvaloy technical experts close to your plant will be glad to help you secure best brazing results and maximum production at lowest possible cost. Write or phone for this valuable service.

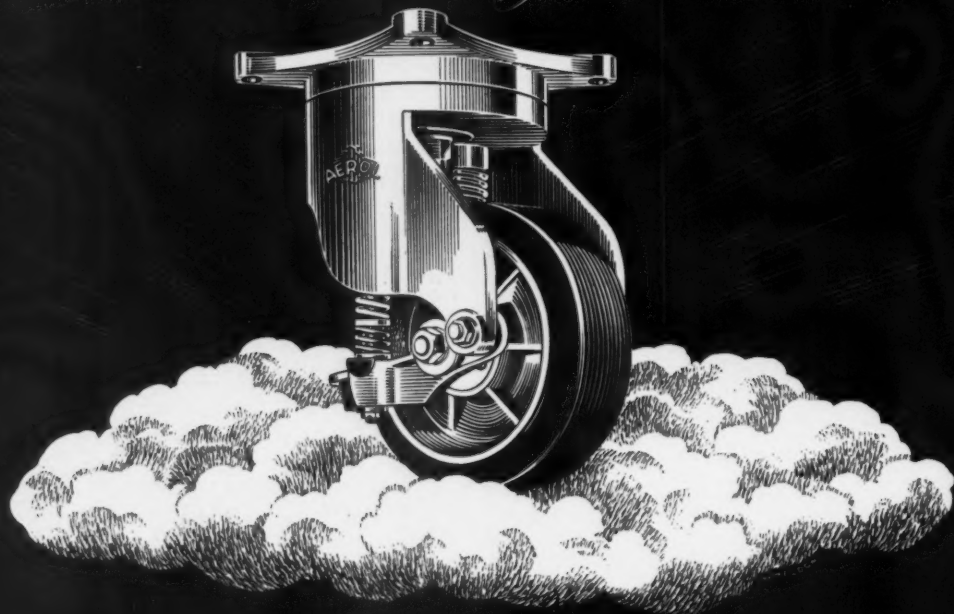


THE AMERICAN PLATINUM WORKS

231 NEW JERSEY RAILROAD AVENUE • NEWARK 5, NEW JERSEY



Aerol Proudly Presents:



THE WORLD'S *finest* SHOCK-ABSORBING WHEEL AND CASTER

At last, here is a shock-absorbing wheel and caster that *actually* provides MAXIMUM shock absorption under any condition—even when truck or dolly is completely empty.

Aerol's new "AERFLO" knee-action unit is a completely trouble-free combination of light and heavy commercial standard springs. They will never unwind, fatigue or pop. Undue wear or breakage caused by "gyrating casters" is completely eliminated by the light spring which takes the stress when truck is empty or near empty—the heavy spring is for maximum or near maximum loads. Both springs can easily be replaced to convert unit to a different load capacity.

Available in the following sizes: 6" - 8" - 10" standard duty—10" x 12" heavy duty and 10" - 12" dual wheels—all Aerol-sealed and "lubricated for life"!

Aerol wheels and casters are available at dealers throughout the United States and Canada...

Please consult your local telephone book for further information.

NO WHEEL ROLLS  LIKE AN AEROL

aerol

AEROL CO., INC., 2424 SAN FERNANDO RD., LOS ANGELES 65, CALIF.

P&H

OVERHEAD CRANES

built in the West . . . for the West



ELECTRICAL EQUIPMENT

built—not borrowed—
FOR CRANE SERVICE

P&H Magnetorque* Control
is the greatest crane
improvement in 20 years.
Get the facts about it!

*T. M. of Harnischfeger
Corporation for electro-
magnetic type brake.



In our new West Coast plant, P&H is producing cranes with all the quality features that make them the outstanding leaders in the industry. For example: P&H Crane electric motors and controls are designed specifically for crane service — not adapted for it. Your P&H Crane will be a balanced unit, perfectly coordinated, job engineered in every detail for *your own* requirements. When you need help, there's no buck-passing to outside suppliers. *P&H — world's leading crane builder — takes the entire responsibility.* Ample parts stocks are maintained in P&H's West Coast Warehouses.

P&H PACIFIC DIVISION

HARNISCHFEGER CORPORATION

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2400 East Imperial Highway, Los Angeles 59, Calif.

San Francisco, 100 Bush Street

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Over 17,000 P&H cranes serve American industry — far more than any other

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES

August, 1952 — WESTERN INDUSTRY

27

Increase Your Storage Space

**Reduce your
Handling costs**



Strong Barrett Storage Racks keep stock organized. Barrett Box-Top Skids provide unit-load moving to any location.

...with **BARRETT** storage rack system

Take a good look at your present storage space. Is it spread all over the plant? Do narrow aisles make stock hard to reach? Are supplies "buried" when you want them quickly? Is space wasted? Do you need more floor space?

If so, you need the Barrett Sectional Storage Rack System . . . the flexible, practical, low-cost method of storing barrels, drums, boxes, skids, dies and open stock to ceiling height where every cubic foot pays its way.

Barrett Storage Racks reduce handling costs, too. Containers are always accessible—quickly inventoried—old stock can be moved first, no rehandling. Compact Barrett Racks can release excessive storage room for productive use—**THAT'S REAL MONEY-SAVING!**

And racking is done so quickly, so easily with a Barrett Portable Elevator. Regardless of the size or nature of your business, the *complete* Barrett Storage System can be profitably applied to your plant. A Barrett Engineer will gladly discuss details and develop a Barrett installation exactly suited to your needs.

Write for Bulletin 5221.

BARRETT-CRAVENS COMPANY 4643 S. Western Blvd., Chicago 9, Illinois

Standard Cycle and Supply Co., 1811 East Sprague Ave., Spokane, Wash., Lakeview 1321; F. E. Bennett, 426 N.W. Sixth Ave., Portland, Oregon, Beacon 3898; Roll-Rite Corporation, 801 Jefferson St., Oakland 7, Calif., Glencourt 1-5921; Irving G. King & Co., 821 Mateo St., Los Angeles, Calif., Tucker 3176; Material Handling Equipment Co., 1437 Elliott Ave., West, Seattle 99, Wash., Alder 7300.



BARRETT
ONE MAN DOES MORE THAN 3 OR 4 . . . WITH A BARRETT



Efficiency at its best. Drums stacked ceiling high. Stock plainly in view—easily moved in and out with a Barrett Portable Elevator.



Storage in bins mounted on skids or pallets will give you the utmost storage capacity per square foot of storage space—stock always "put away" yet easily and quickly accessible.



Machine tool idea pool

In designing machine tools, as in planning countless other products, OSTUCO Steel Tubing provides an endless pool of practical ideas because of its *unlimited adaptability*. Collets, chucks, spacers, spindles, bearings, shafts, ferrules, and handles are but a few of the applications.

By varying the radius of a bend, the length of a taper, the dimension of an upset, etc., an old design can be improved or a new one created. By combining such operations, a part can be made to serve several functions, thus simplifying design. Parts may even be fabricated or forged beyond recognition as a tube section.

Whether you design machine tools or products of a distinctly different nature, you will want to investigate the many quality-improving, cost-reducing features of OSTUCO Tubing. We cannot always promise early delivery estimates on new civilian orders, because of military demands, but it will pay you to consult our experienced engineers about OSTUCO Tubing when redesigning your products to meet future competition.

Write for informative free booklet, "Fabricating and Forging Steel Tubing," showing the many basic fabricating and forging operations OSTUCO can perform.



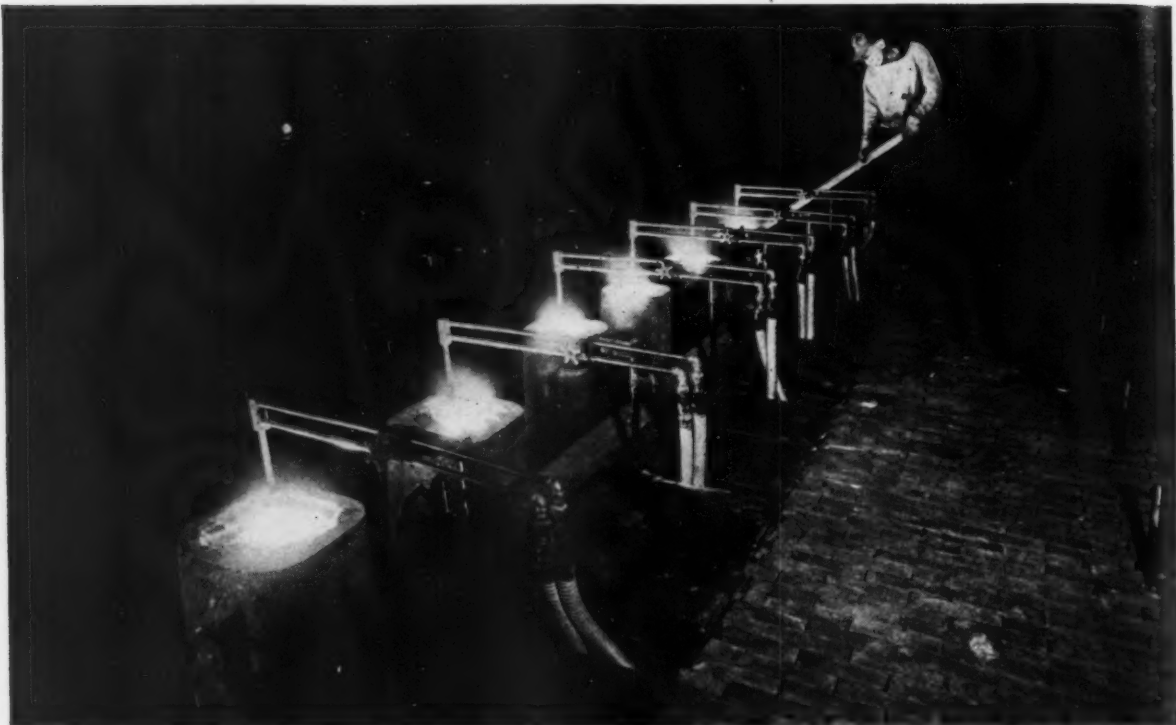
THE OHIO SEAMLESS TUBE COMPANY
Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing
Plant and General Offices: SHELBY, OHIO



SALES OFFICES: Birmingham, P. O. Box 2021 • Chicago, Civic Opera Bldg., 20 N. Wacker Dr. Cleveland, 1328 Citizens Bldg. • Dayton, 511 Salem Ave. • Detroit, 520 W. Eight Mile Road, Ferndale • Houston, 6833 Avenue W. Central Park • Los Angeles, Suite 300-170 So. Beverly Drive, Beverly Hills • Moline, 617 15th St. • New York, 70 East 45th St. • Philadelphia, 1613 Pockard Bldg., 15th & Chestnut • Pittsburgh, 1206 Pinewood Drive • St. Louis, 1230 North Main St. • Seattle, 3104 Smith Tower • Syracuse, 501 Roberts Ave. • Tulsa, 733 Kennedy Bldg. • Wichita, 622 E. Third St. • Canadian Representative: Railway & Power Corp., Ltd.

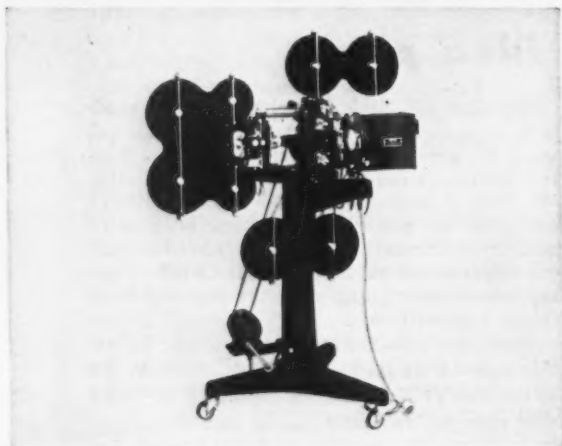
NEWS ABOUT FLEXIBLE METAL CONNECTORS

Here they offer **HEAT RESISTANCE, PROTECTION, and ECONOMY**

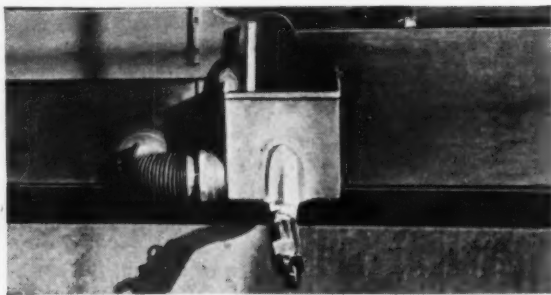


HEAT RESISTANCE The "electric hot topping" process generates a lot of heat. Braeburn Alloy Steel Corp. uses American Flexible Galvanized Steel Tubing to protect wiring from both this intense

heat and impact. American Flexible Connectors can also be made from other metals. Use American Flexible Metal Connectors if your product must move, bend, vibrate, or resist heat, cold or pressure.



PROTECTION American Flexible Shielding Conduit was used on this motion picture film reduction printer. The manufacturer, Oscar F. Carlson Co., desired to protect wiring from crushing and impact. American Flexible Metal Connectors are often the easy solution to a tough design problem. They absorb vibration, protect flexible shafts, connect moving lines, and can be assembled in restricted spaces.



ECONOMY This American Flexible 2" ID Seamless Bronze Tubing is used between flue pan and syruping-off box on a maple syrup evaporator. The George H. Soule Co. chooses this connection because it permits more rapid flow of sap, and absorbs expansion and contraction. To carry air, oil, gases, grinder dust, and many other fluids and semi-solids—American Flexible Metal Connectors should be your first choice, too!

Write for Booklet SS-50: shows how the tubing is designed, used and installed — gives specifications on tubing and fittings. The American Brass Company, American Metal Hose Branch, Waterbury 20, Conn. Pacific Coast Factory Distributor: F. Somers Petersen Co., San Francisco, Los Angeles.

82261

wherever connectors must move... *American* flexible metal hose and tubing



New key to Western progress

Production of Wide Flange Beams by Kaiser Steel—the first produced west of the Mississippi—is a new key factor in the expansion of western industry.

For western construction men now have a *dependable, nearby* source of supply for this vital structural shape.

Larger in sectional area than other beams of a similar type, Kaiser Steel Wide Flange sections offer a bonus in extra strength. They are readily inter-

changeable in all normal structures with other Wide Flange beams.

Two sizes are produced in each group from 8 to 16 inches.

The addition of Wide Flange sections to the standard shapes produced by Kaiser Steel widens our line of popular structurals which can be efficiently employed in the design and construction of modern structures.

More evidence that . . .

It's good business to do business with

Kaiser Steel
built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK

YOU PROFIT MANY WAYS WITH AMERICAN BLOWER AIR HANDLING PRODUCTS

Want to step up efficiency in your power plant? Need a clean, dust-free atmosphere for process work? Do you have power transmission problems? Read how American Blower equipment can help you.



CAPITOL COMFORT

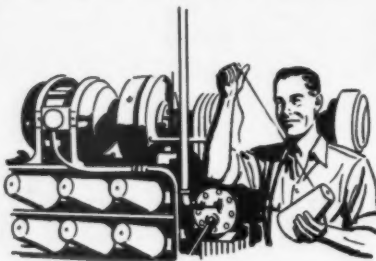
All of us can feel a bit prouder now that our most famous of buildings, the U.S. Capitol, has been renovated. The job also included the power plant where modern new American Blower Mechanical Draft Fans replaced the obsolete equipment. High static efficiency, low RPM, low tip speed and low inlet velocity are but a few of the many reasons these fans enjoy such wide acceptance. Our conveniently located branch offices, staffed with competent engineers, will be glad to furnish you with specific data.



CLEAN AIR

Soap manufacturers strive continually to achieve high standards of purity in their products. But industrial dusts raise a hob at various stages of processing.

American Blower equipment has helped several soap companies overcome this problem. American Blower fans and air washers, for example, are highly effective. The fan supplies an ample supply of circulating air. The air washer cleanses, purifies and freshens the air while removing dust and water-soluble odors.



YARN ABOUT YARN

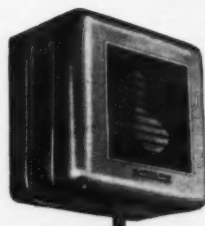
A textile manufacturer was continually changing pulleys or setting the machine rate on his ring-spinning frames to fit the material that worked at the lowest speed. He'd heard about American Blower Gyrol Fluid Drives and decided to try them. Results were amazing. Gyrol Fluid Drive permitted a higher output within safe limits of the material, allowed spinning frames to start gradually with less yarn breakage. For your business, wouldn't smooth power transmission and adjustable speed control be a distinct advantage?

YOUR BUSINESS

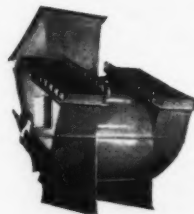
If your needs call for heating, cooling, drying, air conditioning, or air handling equipment, you'll find American Blower an excellent source of supply. For data, phone our nearest branch office.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
WEST COAST PLANT: SAN LEANDRO, CALIFORNIA

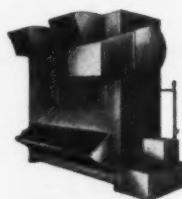
Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION



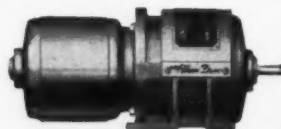
Unit Heaters



Mechanical Draft Fans



Air Conditioning Equipment



Gyrol Fluid Drives



Utility Sets

YOUR BEST
BUY

AMERICAN  BLOWER

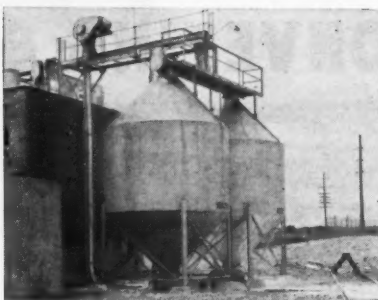
AIR HANDLING
EQUIPMENT

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TORAWANDA IRON

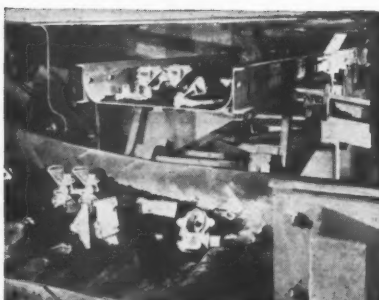
LINK-BELT engineering experience...



Overhead Trolley Conveyors permit straightline production regardless of physical layout—save time and space.



Bulk-Flo feeds—conveys—elevates a variety of free-flowing materials in horizontal, inclined and vertical directions.



Oscillating Conveyors are ideal for handling hot, abrasive, fine, lumpy, oily materials; also for cooling, drying.

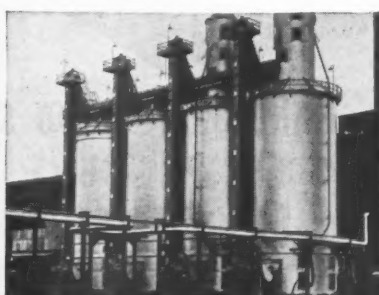
Plus LINK-BELT quality components...



Belt Conveyors provide high capacity and low cost handling of bulk materials. Made in types and sizes to meet every need.

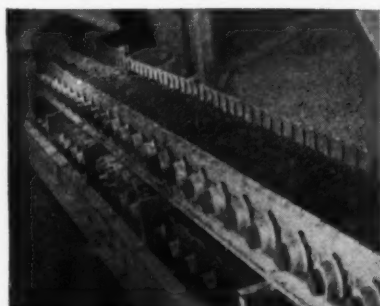


Screw Conveyors are simple, compact, economical. They have proved their advantages in handling bulk materials.



Bucket Elevators are available in a wide range of types and sizes for handling a variety of materials.

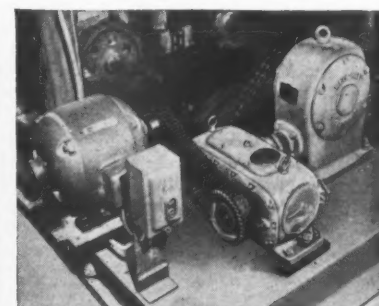
combine to cut your handling costs



Conveyors and Feeders of the apron, slat, flight and chain types are available for handling bulk or packaged materials.



Vibrating Screens. Positive-action, long-life Link-Belt Screens assure accurate sizing for wet or dry materials.



Power Transmission Drives. Link-Belt makes a complete line of chain, gear, fluid and variable speed drives for every need.

FOR the finest in modern conveying, processing and power transmission machinery, call in a Link-Belt engineer while you're still in the planning stage.

The Link-Belt quality line is backed by industry's broadest materials handling and power transmission experience. Our engineers will be glad to work with you or your consultants—help you come up with the

right equipment for your requirements. Catalogs on any Link-Belt product will be sent on request.

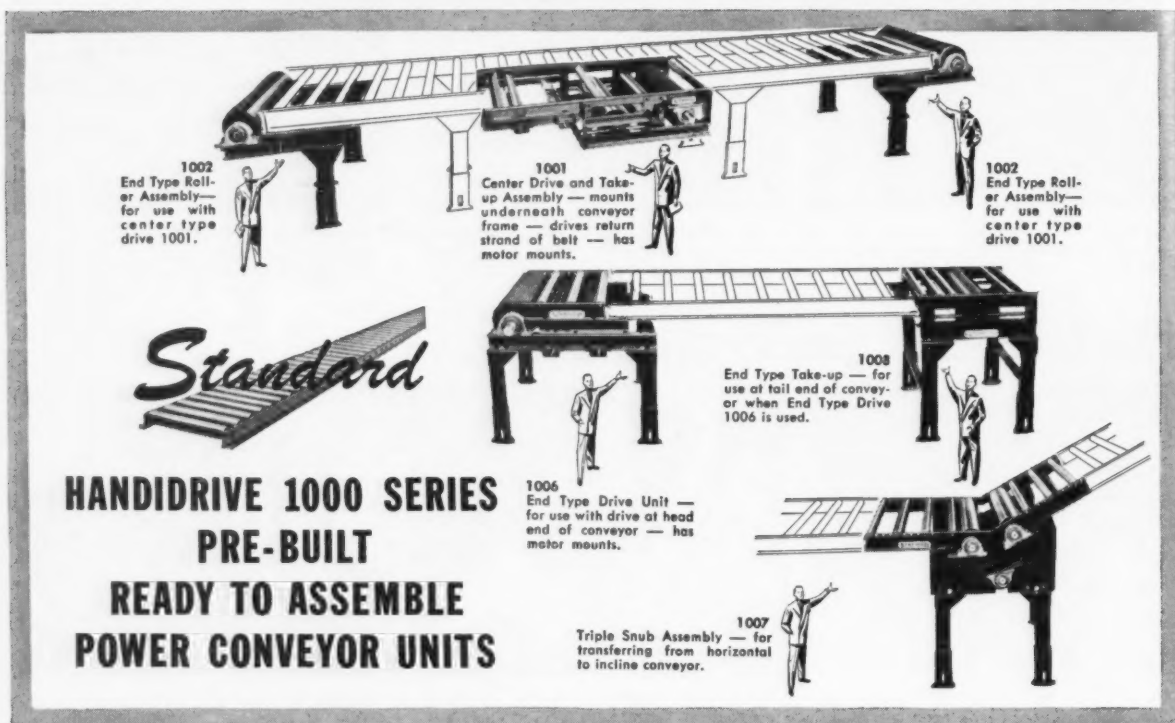
LINK-BELT

CONVEYORS and DRIVES

LINK-BELT COMPANY, PACIFIC DIVISION: Plants and Factory Branch Stores at San Francisco 24, Los Angeles 33, Seattle 4. Offices and Factory Branch Stores at Portland 9, Spokane 13, Oakland 7, Salt Lake City 1.

12,500-F

A NEW, EXPANDED DEVELOPMENT IN CONVEYING EQUIPMENT...



NOW...It's easy to plan...Engineer-Assemble...At low cost... Your own "CUSTOM-BUILT" Power Conveyor System with Stock Units

Standard HANDIDRIVE Pre-Built, Ready-to-Assemble Power Conveyor Units make it a simple, easy matter to assemble a complete conveyor line — or put together stock unit parts to make additions or changes to present conveyors or convert existing belt or roller gravity conveyors to power conveyors.

No special engineering design or construction is required — just order the stock items you need from the HANDIDRIVE 1000 Series Pre-Built Units — drives, take-ups, end roller assemblies, triple snubs, intermediate frames, supports and hangers. The 1000 Series has capacity to pull

a 15,000 lb. total load on a belt conveyor 150 ft. long; available in five belt widths—14—18—24—30 and 36 inch. Also available in the HANDIDRIVE 400 Series for lighter loads not to exceed 400 lbs. pull; belt widths—10½—14½—16½—20½—and 26½ inch—between channel side rails.

Send today for HANDIDRIVE 1000 Series bulletin and complete information on this new, low-cost, make-your-own power conveyor method. Describe commodity you want to handle — dimensions, weight, capacity and lbs. — pull of conveyor required. Complete conveyor engineering service is offered to you without obligation. Write Dept. W1-82.



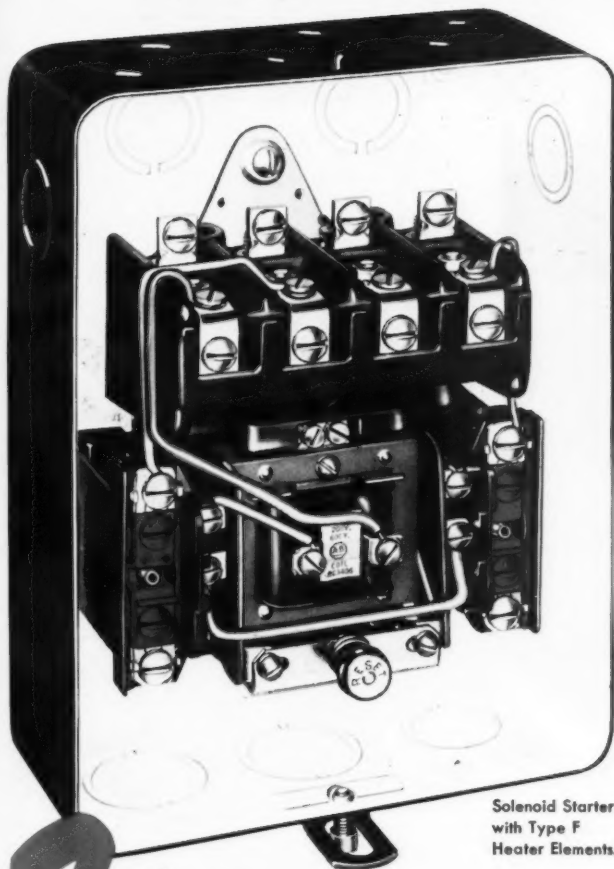
Write also for Bulletin 63B describing Standard Gravity and Power Conveyor Units. Address Dept. W1-82.



STANDARD CONVEYOR COMPANY

General Offices: North St. Paul 9, Minnesota
Sales and Service in Principal Cities

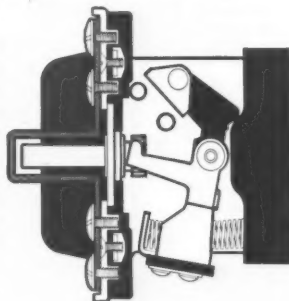
San Francisco: 840 Harrison St. • Los Angeles: 115 E. 23rd St. • Portland: 1115 N. W. Glisan St.



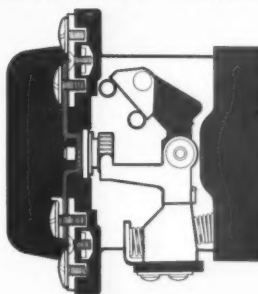
Solenoid Starter
with Type F
Heater Elements.

THERMAL OVERLOAD RELAY WITH CONVENTIONAL DUAL UNIT

Ordinarily, A-B
overload relays
have a soldered
ratchet spindle
(yellow) that is
separated from
heaterstrip (red).
Heat radiated by
overload heater
melts solder on
spindle and re-
leases ratchet.



THERMAL OVERLOAD RELAY WITH SUPER-FAST COMBINATION UNIT



New, super-fast
element has sol-
dered ratchet
(yellow) brazed
directly on heat-
er strip (red),
permitting quick
transfer of heat
to melt the solder
and thereby re-
lease the ratchet.

New

SUPER-FAST COMBINATION UNIT

for protecting hermetically sealed motors
used in refrigeration compressor service

Combination Unit for super-fast operation



TYPE F ELEMENT
Soldered ratchet spindle is
brazed to heater for rapid
conduction of heat to solder.

ALLEN-BRADLEY CO.
1316 S. Second St.
Milwaukee 4, Wis.

Most motors used for hermetically sealed compressors are cooled by the refrigerant circulated over the motor windings. They are worked beyond the limit of air-cooled motors, and have little overload reserve.

To give dependable overload protection to these hard-working motors, Allen-Bradley has added the new Type F quick-acting heater element. Its special construction, described above, makes it respond within a few seconds to any overload, and trips the overload relay before motor burnout occurs.

If you need motor controls that are quick-acting in case of overload, specify Type F combination elements for Allen-Bradley solenoid starters.

Dual Unit for average operation



SPINDLE



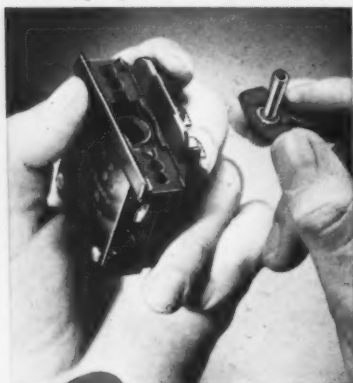
HEATER

ALLEN-BRADLEY

OVERLOAD PROTECTION



Pick the right spindle to fit the starting cycle. Insert the spindle in the A-B thermal overload relay. The relay is ready for the heater element.



It's so easy to provide Starting and Running Protection with Allen-Bradley Thermal Overload Relays

INTERCHANGEABLE RELAY SPINDLES



TAN SPINDLE—for normal allowable locked rotor time and long starting time.

RED SPINDLE—for normal allowable locked rotor time and normal starting time.

GREEN OR GRAY SPINDLE—for low locked rotor current and short allowable locked rotor time.



SUPER-FAST SPINDLE—for low locked rotor current and extremely short locked rotor time.

FIRST—to provide locked rotor protection—pick the overload relay spindle (see pictures at left) that matches the motor characteristics. There is an Allen-Bradley relay spindle to meet every need.

SECOND—to provide running protection—pick the heater element (see pictures at right) to fit motor full-load current. There is an Allen-Bradley heater element for every rating. This two-way protection is standard for all Allen-Bradley solenoid motor controls.

INTERCHANGEABLE HEATER UNITS



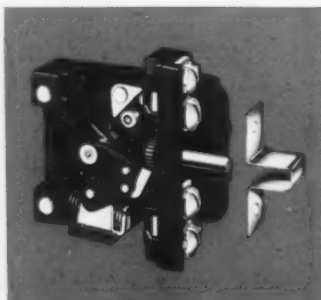
LOW RATING



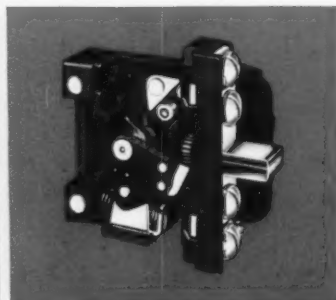
MEDIUM RATING



HIGH RATING



A-B overload relay with heater element detached to show the relay spindle.



A-B overload relay with heater element mounted in place over the relay spindle.

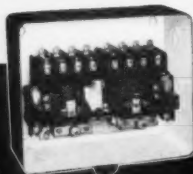
ALL ALLEN-BRADLEY SOLENOID MOTOR CONTROLS HAVE TWO-WAY OVERLOAD PROTECTION



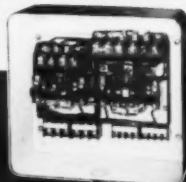
Manual Starter



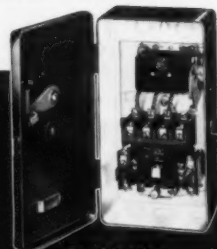
Automatic Starter



Reversing Starter



Multispeed Starter



Combination Starter



ALLEN-BRADLEY

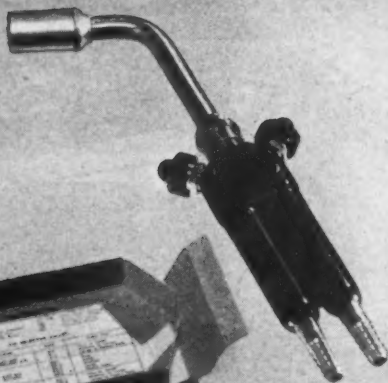
SOLENOID MOTOR CONTROLS

QUALITY

ALLEN-BRADLEY CO.
1316 S. Second Street
Milwaukee 4, Wis.

the new

*Koolite** torch...



**we sold, to date, 102,396
of this new model torch...
and of a prior model over 150,000**

This new *Koolite* Torch offers many advantages — it is always cool to the touch because of its smooth, long lasting plastic handle. The blowpipe is designed to be used with either compressed air or oxygen and any of the useable fuel gases. It will produce a brush like or a needle point flame. The three tips are easily exchangeable. Clear operating instructions are on the box as is also an understandable replacement parts list. You will like the reasonable price and the fine performance of this torch. It is made by one of the oldest welding equipment companies.

*The word "Koolite" is a registered trade-mark.

Made by

National
SINCE 1910

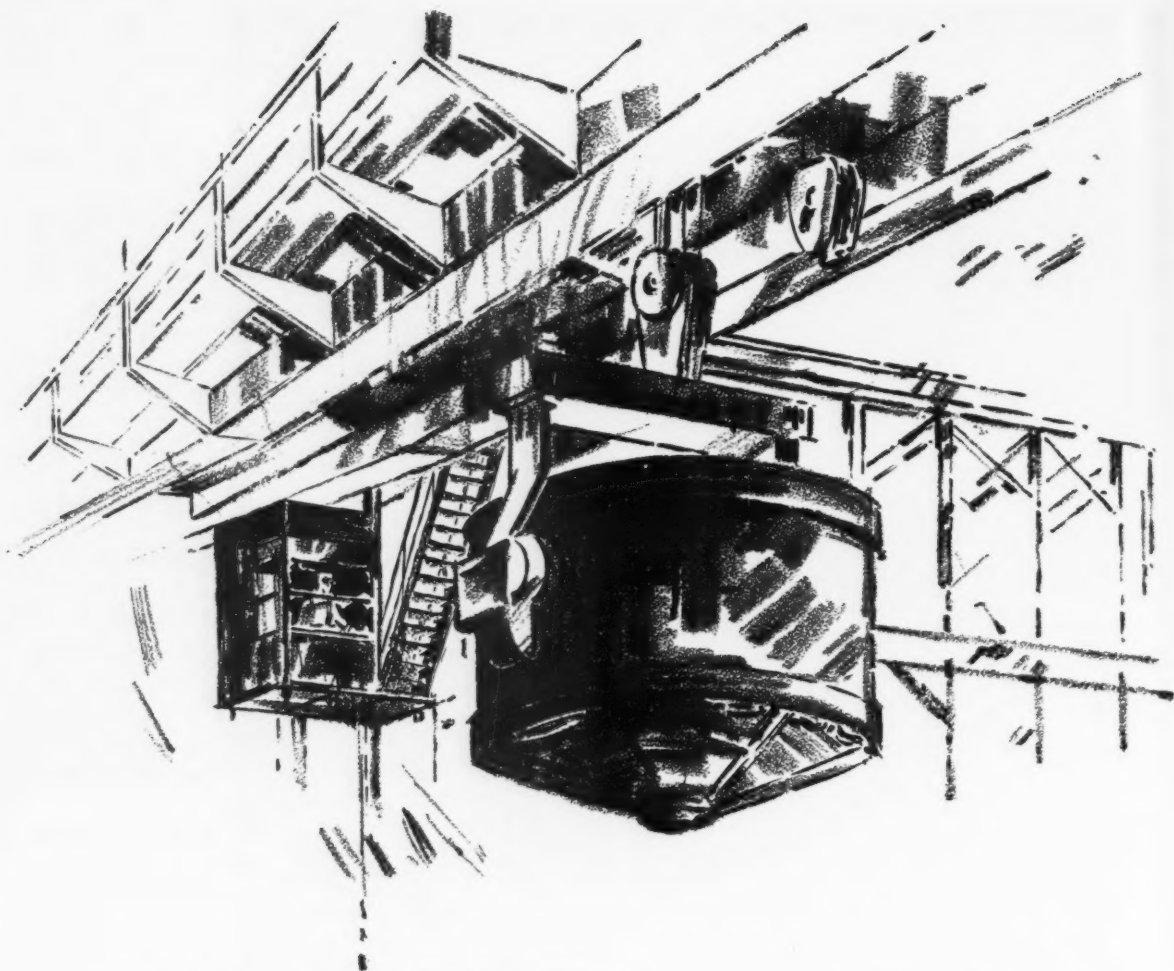
WELDING EQUIPMENT CO., San Francisco 5, California

it uses either
oxygen or com-
pressed air
with any of the
useable fuel
gases—city and
natural gas,
propane and
butane or
acetylene.

just select the
proper tip type
and sizes

it gives you a
needle point or
brush like flame

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and wrench
only **\$9⁵⁰**



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In the steel industry — in mill, foundry, fabricating plant and warehouse — you'll find EDERER "job-engineered" cranes meeting the specific — and demanding — job requirements of this industry. Similarly, you have specific requirements for your materials handling — and EDERER can "job-engineer" a crane to those requirements.

For over 50 years, EDERER — one of the largest crane manufacturers on the Pacific Coast — has used this "job-engineering" know-how — and accompanying plant facilities — to build cranes for all types of industrial use. Delivery? When do you want it? Why not write today for EDERER Crane Inquiry Form?

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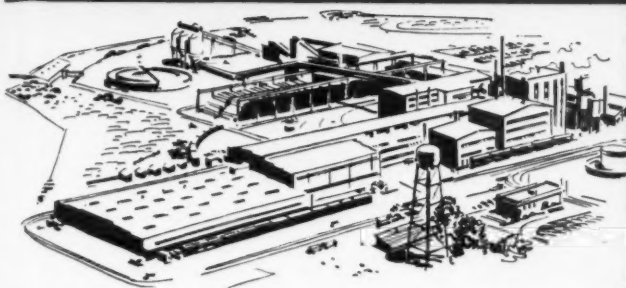
Export Division: 301 Clay St., San Francisco 11, Calif.

50 YEARS "JOB-ENGINEERING" CRANES FOR INDUSTRY

EDERER

CRANES

SUREST WAY TO SEPARATE THE MEN FROM THE BOYS...



• Continual high temperature operation is probably the surest way to "separate the men from the boys" where lubricants are concerned...an inferior oil just won't stand up to the exacting day-in, day-out demands of heavy-duty machinery.

Officials of the San Joaquin Division plant of Fibreboard Products Inc., at Antioch, Calif., have found the Gargoyle DTE Oil used in their expensive Pusey-Jones paper making machine of such high quality and stability, that it should not have to be changed for many years.

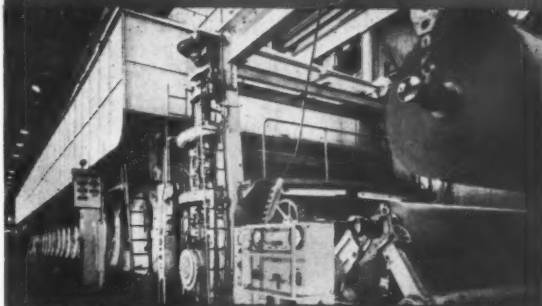
This despite the fact that the oil is subject to extreme heat and constant motion—two factors which frequently will cause an inferior lubricant to break down.

In more than three years of continual operation, the Pusey-Jones machine has never had a shutdown due to lubrication failure, and Fibreboard Products officials report absolutely no increase in the acidic content of the Gargoyle DTE Oil which has kept the unit operating around the clock.

Your plant, too, can benefit from the advantages of highest quality products and a lubrication engineering program that's tailor-made for your operation. Prove it for yourself...call your nearby General Petroleum office today!



A vital part of the Pusey-Jones machine is the calendar stack.



Starting as pulp at the wet end of the Pusey-Jones, paperboard to be used as corrugating medium emerges from the dry end, right foreground.



General view of the Fibreboard Products Inc., San Joaquin Division, machine room at Antioch, Calif.



**General
Petroleum
Corporation**

*—Converting nature's gift
for better living*

11-19

EDITORIAL COMMENT

State Trading Illogical

A COMPLAINT that the ECA policy of shipping wheat to Japan instead of flour has caused the shutdown of the Pillsbury export mill at Astoria, and the transfer of operations to two newly acquired Canadian mills, was made recently by the ILWU. Pillsbury's reply was that American milled flour could not be sold in Far Eastern markets when Canadian flour was being offered at considerably lower prices for the same or even better quality. The Canadian mills were purchased, said George S. Pillsbury, in order to keep the Pillsbury name alive in the Far East, until a change in government policy made it possible to resume operations at Astoria.

Actually, ECA is trying to do its job at the least cost to American taxpayers in general, and the strategic reasons for supporting Japan's economy cannot be lightly disregarded. But at the same time, the sooner we get away from state trading the better. Four years ago *Western Industry* took occasion to point out, in connection with the fight led by John Locke of Fisher Flouring Mills of Seattle against the International Wheat Agreement, that the American flour milling industry was on the verge of being swallowed up in state trading. Our comment at this time was:

"Free enterprise, as we see it, means above all else freedom to be enterprising. And this in turn calls into operation the soundest judgment of each individual or company, based on experience. The minute some form of state trading appears, the individual initiative and judgment inevitably is subordinated to some form of so-called collective action that all too often is dominated by the thinking of people who have not been through the indispensable baptism of experience in private business."

An interesting example of progress away from state trading is a recent deal for 6,380 tons of prunes made individually by a San Francisco exporting firm with Norway, which the Norwegian private firms handled in a three-cornered transaction involving sale of furs to European countries, transfer to dollars through Netherlands Bank, etc., but without any assistance from the MSA.

That Wobbly Decimal Point

HERBERT HOOVER, in his speech at the Republican national convention, felt very sorry for the poor decimal point which he said was being so carelessly shoved around by the Democrats. Good thing he didn't read the editorials in the July issue of *Western Industry*, where we credited both Henry Kaiser and Governor Earl Warren with forecasting a population of 20 billion or more for California by 1970!

In journalistic language this is known as a "typo," a typographical error that got by supposedly eagle-eyed proof-readers. Twenty million was the figure that should have appeared, and we trust that Mr. Hoover will not hold us up to public shame in any of his future speeches. Perhaps our error will serve a good purpose, however, in reminding people that the West is growing a lot faster than any of us are able to comprehend fully, and that we all need to raise our sights and get ready for the days to come.

IN OUR MAILBOX

Instrument Show

Editor, *Western Industry*:

On behalf of the Richland Section of ISA, I wish to thank you for your interest in our Instrument Show and for the publicity. We believe it turned out to be a very successful event.

All work in arranging for the show was donated, and the vendors were not charged for exhibit space. Thirty-three vendors representing 100 manufacturers showed items of equipment. The registered attendance was 1,002 persons, the majority of whom are engaged in instrument or technical work. Visitors came from Spokane, Portland, Port Angeles and Seattle. The reaction was very pleasing, and it is very likely that we shall hold a show again next year.

M. T. SLIND
Program Chairman, Richland Section
Instrument Society of America
Richland, Washington

(Ten years ago the idea of holding an instrument show at Richland would have seemed about as probable as holding it on Mars. Then Richland was a small farming area surrounded by a lot of desert. Today it is the home of a tremendous industrial plant, the government's plutonium works.)

Now We Know

Editor, *Western Industry*:

I read with interest your editorial comment entitled "Women in Business" in the June, 1952, issue.

You will probably be interested to know that most of the letter writing experts advocate the use of "Ms." Jones when in doubt of whether to use "Miss" or "Mrs.," and a recent issue of one of the letter-writing service bulletins reported that many of the larger companies are now following this practice. As a secretary, I find it saves many a minute that would otherwise be lost in pondering the "Miss" or "Mrs." question.

MRS. SHIRLEY HARDESTY
San Diego, Calif.

(The editorial referred to pleaded for some reliable indication of the marital status of women in business who sign themselves "Mary Jones" and let others guess as to whether they should be addressed as "Mrs." or "Miss." We are not sure Mrs. Hardesty has the perfect answer; some people think "Ms" means "manuscript.")

Some More Flowers

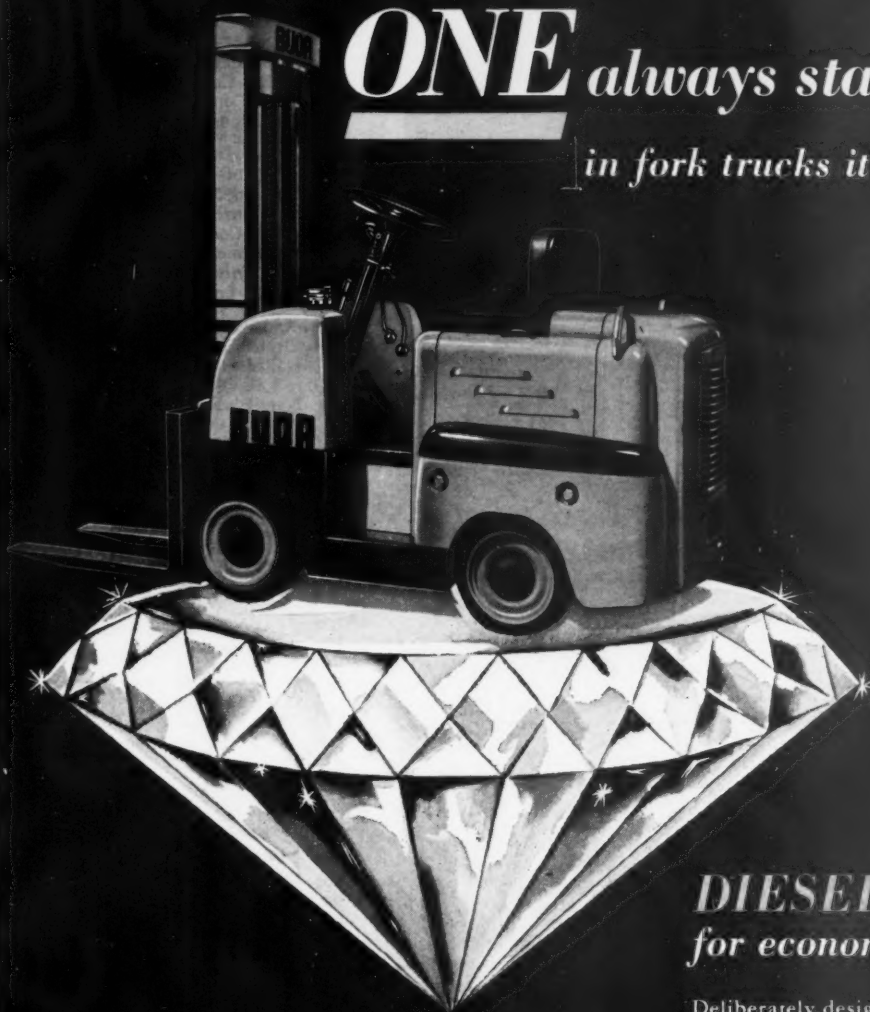
Editor, *Western Industry*:

Please accept my thanks for the several "tear sheets" sent us on the Tooling Dock article presented on pages 39-42 of your May issue.

May I say that the format and general presentation was up to the high standards of technical excellence that seems to characterize the *Western Industry* presentations, which seem to be fully on a par with *American Machinist* and a very few other outstanding eastern magazines.

LELAND A. BRYANT
Geometric Mastering Corporation
Beverly Hills, California

ONE always stands out!
in fork trucks it's **BUDA**



**DIESEL Powered
for economy**

Deliberately designed "years ahead" to give you more style, performance and operating economy, the new Budas are as beautiful as they're tough... as brilliant as they're efficient. Packed with more than 50 exclusive functional design features and powered by *our own* million-hour proved Buda Industrial Type Diesel or gasoline engines, Buda "FT" Series Fork Trucks are truly "tomorrow's trucks today."

See them at your Buda Distributor now. Write for Bulletin 1570 and complete details today. The Buda Company, Harvey, Illinois



THE LINE WITH ALL 3 FOR DIVERSIFIED HANDLING

BUDA

BH 43

See the new Buda Fork Trucks at Booth No. 544—
4th Western Packaging & Materials Handling Exposition, Los Angeles—August 12-14.



Towmotor leading a truck at Welch Grape Juice Company, North East, Pa.

cut production costs . . . let Towmotor-hours replace costly man-hours. Increase capacity, maintain profits with a Towmotor fork lift truck. Towmotor handles *all* types of material. For the name of your nearest Towmotor representative and copies of Job Studies covering your industry, write Towmotor Corporation, Div. 67, 1226 E. 152nd St., Cleveland 10, Ohio. Representatives in all principal cities in U. S. and Canada.



FORK LIFT TRUCKS and TRACTORS
RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

CALENDAR OF MEETINGS

Aug. 12-14—4th Western Packaging and Materials Handling Exposition, Shrine Convention Hall, Los Angeles. Contact Clapp & Poliak, Inc., 769 Monadnock Bldg., San Francisco.

Aug. 13-14—Second biennial Packaging and Materials Handling Institute, Shrine Auditorium, Los Angeles. Contact: John R. Huffman, Department of Industrial Engineering, University of Southern California, Los Angeles.

Aug. 19-23—American Institute of Electrical Engineers, Pacific General Meeting in Phoenix, Ariz. Contact H. H. Henline, 33 W. 39th St., New York City 18, N. Y.

Aug. 27-29—Western Electronic Show and Convention, Long Beach Municipal Auditorium. Contact Heckert Parker, 108 Ninth St., San Francisco, Calif., HEMlock 1-2525.

September—California Association of Port Authorities state convention. Contact Dudley Frost, Suite 215, 1419 Broadway, Oakland, or Alvin K. Maddy, 1333 El Embarcadero, Long Beach.

Sept. 3-5—Pacific Coast Gas Association Conference, in Los Angeles, Calif. Contact Clifford Johnstone, 447 Sutter St., San Francisco 8, Calif.

Sept. 10-13—Fourth annual Summer Management Conference, presented by University of California Institute of Industrial Relations through facilities of U. C. Extension, will be held at Ahwahnee Hotel, Yosemite. For additional information, contact Department of Conferences and Special Activities at U. C. Extension, Berkeley, Calif.

Sept. 12-16—Tenth National Instrument Conference and Exhibit, Los Angeles, Calif.

Sept. 14-20—Concrete Reinforcing Steel Institute, semi-annual meeting, at Broadmoor Hotel, Colorado Springs, Colo. Contact Association headquarters, 38 So. Dearborn St., Chicago, Ill.

Sept. 22-25—American Mining Congress, biennial metal and nonmetallic mineral mining convention and exposition, in Denver. Contact Society headquarters, 1200 18th St., Washington, D. C.

Sept. 26-27—Intermountain Purchasing Agents, Pacific District No. 1 regional meeting in San Francisco. Contact E. G. Chambers, executive secretary, 461 Market St., San Francisco.

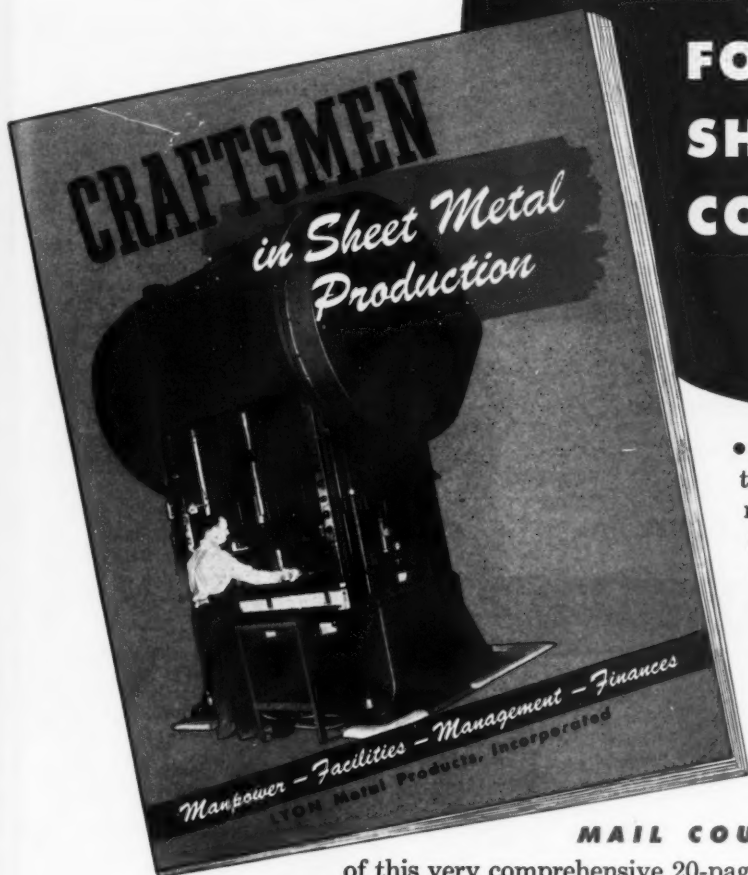
Sept. 28-30—Pacific Northwest Trade Association, fall conference, Yakima. Contact D. C. Knapp, executive secretary, 219 Olympic Hotel, Seattle.

Continued on page 44

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SOURCE
OF SUPPLY**

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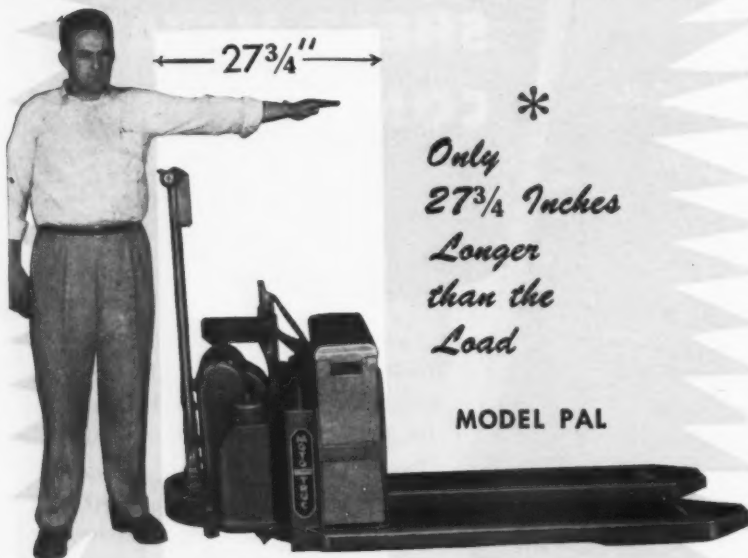
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All the **POWER** *you want*
In an **ARMS LENGTH**



*Only
27 3/4 Inches
Longer
than the
Load*

MODEL PAL

Think of it . . . in only 27" is packed the complete power unit for the "Walkie" type lift truck. *Other models are only 23 3/4" . . . That's space efficiency . . . plus!

If you have a material handling problem that requires minimum "operation area", ask about the "Walkie" MOTO-TRUC. Its application in close areas is making history every day . . . write for complete information on all the advantages of MOTO-TRUC.

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PALLET . . . PLATFORM . . . HI-LIFT TRUCKS
LARGEST EXCLUSIVE MANUFACTURER OF "WALKIES"



CALENDAR OF MEETINGS

Begins on page 42

Oct. 1-2—California Manufacturers Association statewide meeting. Contact Mr. John Knauff, 315 W. 9th St., Los Angeles 15.

Oct. 11-14—National Association of Waste Material Dealers, fall meeting at Hotel Ambassador, Los Angeles. Contact association headquarters, 271 Madison Ave., New York.

Oct. 12-16—National Canvas Goods Manufacturers Association national meeting. Contact Fred W. Behnke, 1132 Mission St., San Francisco.

Oct. 17-18—Northwest Personnel Association regional conference at Davenport Hotel, Spokane, Wash. Contact Marion R. Jenkins, Whitworth College.

Oct. 21-23—28th Pacific Coast Management Conference, at Claremont Hotel, Berkeley. Contact Everett Van Every, Secty.-Mgr., California Personnel Management Association, Farm Credit Bldg., Berkeley 4, Calif.

Oct. 28-31—American Waterworks Assn., California Section, in Pasadena, Calif. Contact A. R. Houseman, 907 Monadnock Bldg., San Francisco, Calif.

Nov. 4-8—National Wheel and Rim Association convention in San Francisco. Contact W. J. Renehan, convention chairman, c/o Stonewheel, Inc., 2540 S. Wabash Ave., Chicago, Ill.

Nov. 9-10—California Refrigerated Locker Association state convention. Contact Morris W. Walker, convention chairman, 372 Castro St., Hayward, Calif.

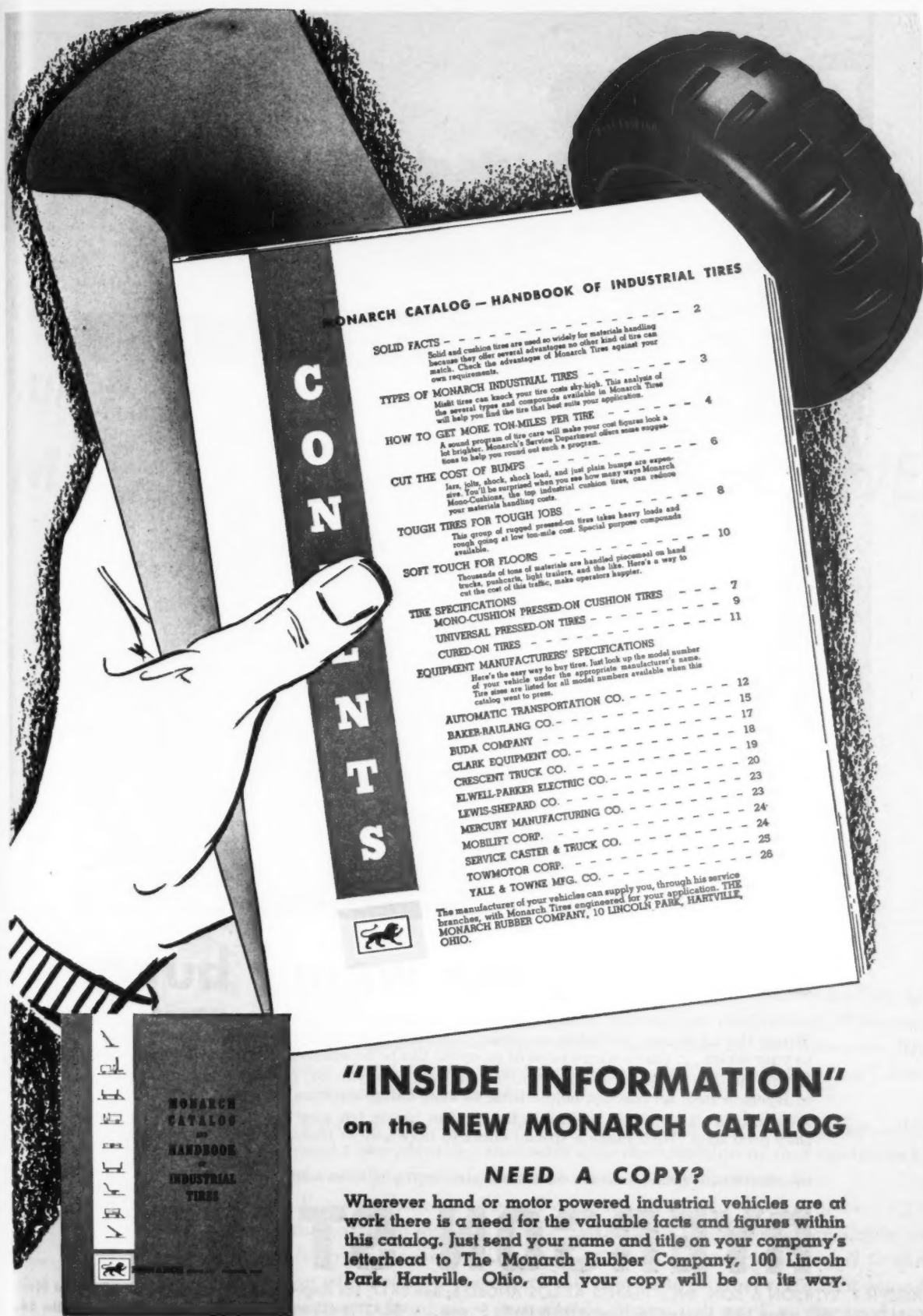
Nov. 10-12—California Fertilizer Association Convention, at Desert Inn, Palm Springs, Calif. Contact Sidney H. Bierly, Exec. Sec. and Mgr., 4700 District Blvd., Los Angeles 58, Calif.

Nov. 10-12—Pacific Logging Congress regional meeting. Contact Carwin A. Woolley, secretary, 1222 American Bank Bldg., Portland, Ore.

Nov. 12-14—Annual meeting of National Reclamation Association in Long Beach, Calif. Contact William E. Welsh, secretary-manager, at National Press Bldg., Washington 4, D. C.

Dec. 4-5—California State Chamber of Commerce state meeting in San Francisco. Contact James Mussatti, general manager, California State Chamber of Commerce, 350 Bush St., San Francisco.

Jan. 12-14, 1953—American Dehydrators Association convention in Phoenix, Ariz. Convention headquarters will be at Jokake Inn and Paradise Inn, Phoenix.



MONARCH CATALOG — HANDBOOK OF INDUSTRIAL TIRES

CONTENTS

SOLID FACTS 2
Solid and cushion tires are used so widely for material handling because they offer several advantages no other kind of tire can match. Check the advantages of Monarch Tires against your own requirements.

TYPES OF MONARCH INDUSTRIAL TIRES 3
Made tires can knock your tire costs sky-high. This analysis of the several types and compounds available in Monarch Tires will help you find the tire that best suits your application.

HOW TO GET MORE TON-MILES PER TIRE 4
A sound program of tire care will make your cost figures look a lot brighter. Monarch's Service Department offers some suggestions to help you round out such a program.

CUT THE COST OF BUMPS 6
Jars, jolts, shock, shock load, and just plain bumps are expensive. You'll be surprised when you see how many ways Monarch Mono-Cushions, the top industrial cushion tires, can reduce your materials handling costs.

TOUGH TIRES FOR TOUGH JOBS 8
This group of rugged pressed-on tires takes heavy loads and rough going at low ton-mile cost. Special purpose compounds available.

SOFT TOUCH FOR FLOORS 10
Thousands of tons of materials are handled piecemeal on hand trucks, pushcarts, light trailers, and the like. Here's a way to cut the cost of this traffic, make operators happier.

TIRE SPECIFICATIONS 7
MONO-CUSHION PRESSED-ON CUSHION TIRES 9
UNIVERSAL PRESSED-ON TIRES 11
CURED-ON TIRES 11

EQUIPMENT MANUFACTURERS' SPECIFICATIONS
Here's the easy way to buy tires. Just look up the model number of your vehicle under the appropriate manufacturer's name. Tire sizes are listed for all model numbers available when this catalog went to press.

AUTOMATIC TRANSPORTATION CO. 12
BAKER-RAULANG CO. 15
BUDA COMPANY 17
CLARK EQUIPMENT CO. 18
CRESCENT TRUCK CO. 19
ELWELL-PARKER ELECTRIC CO. 20
LEWIS-SHEPARD CO. 23
MERCURY MANUFACTURING CO. 23
MOBILIFT CORP. 24
SERVICE CASTER & TRUCK CO. 24
TOWMOTOR CORP. 25
YALE & TOWNE MFG. CO. 26

The manufacturer of your vehicles can supply you, through his service branches, with Monarch Tires engineered for your application. THE MONARCH RUBBER COMPANY, 10 LINCOLN PARK, HARTVILLE, OHIO.

MONARCH CATALOG
HANDBOOK
OF
INDUSTRIAL
TIRES

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4th Annual

MATERIALS HANDLING ISSUE



Materials Handling, as a concept, can be likened unto an iceberg in that there is much more to it than appears on the surface. When we walk into an industrial plant, almost invariably we see conveyors, lift trucks, hand trucks, hoists, elevators, and assorted means of handling materials in that plant.

What we don't see is the submerged part of that iceberg—the thought and planning that went into the selection of that equipment, and how the physical plant was made to accommodate it.

Proper planning is based on analysis of (1) your problem, (2) your existing physical structure, and (3) equipment available to solve your problem in your plant. Best suggestion is to call in the man who knows—your Materials Handling Engineer. He is in a good position to know what is available, how it will work on the problem confronting you, and to prescribe the right solution.

WHICH COMES FIRST...

the building or its use?

YOU HAVE YOUR CHOICE of three ways to go about designing your new plant:

1. *Get your architect to design a good building, and fit your activity and equipment into it.*
2. *Design a building to fit your equipment, and adjust your production activity around it.*
3. *Determine the flow of materials through receiving, processing, storing and shipping, and design your building around these functions.*

This third method, although the one least used, certainly offers a far greater and more profitable payoff to industry.

Here is the story of one California plant designed according to the third choice. Operating personnel, who had a great stake in this plant, made nearly 40 visits to other plants on tour of materials handling equipment inspection. In effect, these men were their own materials handling engineers.

They evaluated all kinds of materials handling equipment in action. They talked to the persons who used it. They exhaustively analyzed all possibilities. With their own plant problems in mind, they planned their new structure—building, equipment and layout.

Result: management liked it, even though it cost slightly more money than "conventional" arrangement. Management liked it because it became a truly functional, working, live and efficient plant that cost less to operate than a more conventionally designed plant.

THREE MEN—the plant manager, the operations superintendent, and the maintenance department foreman, decided to offer their counsel and assistance, when it became known that the company was going to erect a brand new plant at a different location. Since they were the ones who would be doing the work in the new building, and since they would be more directly concerned with the physical plant than anyone in the "front office," they reasoned that they had license to get into the planning activity.

"Practical experience," one of these men insisted, "is of far more importance in the matter of who is qualified to design and lay out a warehouse than an engineering background or a contractor's license." On that premise, they met in evening sessions to discuss their ideas and how they were to present them to top management without sounding like upstarts or presumptuous youngsters.

Let's listen to these men:

What's the Use?

It was obvious from long experience that our operation could be broken down into three routines: (1) receiving stock, storage of that stock, and shipping it to customers; (2) layout and packing of customer orders; and (3) the office routines involved in these two activities.

In our original location, the building, at least so it seemed to us, was of the "cart before the horse" design. Our offices were located on the first floor, taking up nearly three-fourths of the floor area there, and thus forcing the use of the upper floors and basement for the great bulk of our warehousing stock, layout, and packing operation.

We felt that operations in the new building should be different, so our first step was to analyze the importance of our operations. In doing this, we figured we'd make our first study of the most important operation—a variation of the principle of first things first.

To determine the most important activity, we asked ourselves:

In which of the three main routines:

- (1) did we employ the most help?
- (2) did we use most equipment?
- (3) was the most time consumed?
- (4) was the most space required?

After answering the question as to the number one candidate, we asked it again to determine the number two candidate. The number three candidate became obvious since we had already decided we were a three-routine business.

In our opinion, our number one—in importance—plant activity was our layout and packing operation, for it scored a first in almost every question. Second was our stock receiving—storage—shipping routine, and third in importance was our office activity.

In our analysis, however, we decided stock shipping was so dependent on the layout-packing operation that we should break it away from the stock receiving—storage routine—and make it a part of layout-packing. This would place these closely related activities under the supervision of one man, thus permitting close control and supervision of them.

Our next step was: where to locate this most important routine? We knew our property size was such that we would be forced to have a minimum of two floors to handle our three routines and we thought three floors would be required if proper account for future possible expansion was taken. So, it became a question of whether to use the first, second, or third floors for layout-packing-shipping.

We decided on the first floor for several reasons. Most important because in shipping orders to dealers (we serve

the seven Western states) we have many trucks loading, sometimes several at once, all of which stop for but comparatively short periods, so it made sense to have this phase of the routine on the street floor. That meant the rest of the routine of layout and packing also had to be placed on the first floor if they were to be kept together as a unit.

The second activity—receiving and warehousing the stock—had to go on the second floor (or third) since we felt the layout-packing-shipping routine would require all of the first.

Our least important routine (by comparison) was the office, so it wound up on our third floor—the least valuable of all floors from the standpoint of our operations.

Now, in making this decision as to what floor was to be assigned what duty, it became obvious that we were going out on a limb and would have to justify the expense of raising all our stock to the second floor, and building that second floor with sufficient floor load capacity to hold the weight.

We knew this would be a toughie because hide-bound engineers would think of the cost of the extra-heavy second floor construction to take the weight of our stock. Further, we would be lifting *all* of our stock to the second floor and then dropping about 25 per cent of it to our first to be held in bins for the layout of less than case lot orders.

Seventy-five per cent of this lifting could be eliminated by putting stock storage on the first floor, we knew, and we further knew the engineers would spot this fact. But it seemed to those of us who were actually doing the work that there were other advantages which more than offset the cost factor of lifting this 75 per cent of our stock.

However, we went back to our idea of taking the most important routine first and putting it in the best location in the building, and left the justification of stock storage on the second floor when we considered the second floor.

Where's the Flow?

Our first step in planning the layout-packing-shipping operation was to cut out a plywood panel to the scaled dimension of our property. That represented the first floor space we had to work with.

We then reworked our present layout-packing department work flow until we had it as we thought it should be. By that I mean we sketched on paper our present conveyor system for handling our orders and revamped it to pass through existing columns, walls, or any other physical obstructions presented by our building.

We also rearranged (on paper) bins, packing tables, benches, supply closets, and all else to what appeared to us to be the most economical and efficient layout.

Prior to all this, in fact long before we had purchased property for a new building, we had been developing a library covering mechanical equipment used in warehouses, and warehouse arrangement ideas. As we saw equipment in industrial magazines we cut out the articles and/or pictures. We did the same for the ideas we read or heard about.

Those items of equipment, or the ideas we could use in our location at that time, were purchased or installed. Those items or ideas we were not permitted to buy, or ones that were impractical to install in that location, were kept in a folder labeled "Dream House." This folder then was kept up-to-date, and as we found newer or better pieces of equipment or ideas to supplant those we had, we tossed out the old and filed (or used, if we could) the new.

One more thing we did along this educational line. We made about 40 plant visits, primarily local, to firms which were using the ideas or equipment we liked for our dream house. In this way we learned much more about the equip-

ment. Our paper plans were, then, a composite of experience, up-to-date reading, and first-hand observation.

Once we had these plans completed on paper, we began making scale models of all the equipment—bins, hand-trucks, lift trucks, conveyors, packing tables, benches, elevators and the rest. These were working models where they needed to be (not the conveyor), and to our floor scale.

Once the models were completed we set them on the scaled board representing the first floor. From that point on it was a matter of jockeying the model around to prove out our "dream house" paper and folder ideas.

The second floor—stock receiving and storage—was more of the same. And so was the third floor, which floor contained our offices.

How Important?

After we had made what seemed the most efficient of arrangements, we then, and not until then, built our utility rooms, locker rooms, and the other spaces pertaining to the operation.

We kept all unrelated spaces off the floor. In other words, we did not locate an office on the layout-packing-shipping floor unless that office had positive and direct connection with that activity. Too often a piece of space is assigned to an activity more because it happens to be empty, or available, not because it is a part of the functions on that floor.

Now, the problem of supporting the second floor came up. We had built a model of each floor, but had not placed one floor over the other in so doing.

We fitted our supporting columns in the first floor where those columns would not interfere with the flow of traffic. That meant that in some cases the columns were unevenly spaced.

Since the cost of erecting a building was something that came up only once, but the cost of moving freight from one end of the floor to the other came up every time freight was moved, we decided that in the aggregate it was cheaper to build a building with columns hidden in little used spaces, rather than to think strictly in terms of cost of construction—which terms meant the columns should be evenly spaced and that too often called for columns right in heavily traveled aisles.

True enough, we realized that we couldn't completely disregard some orderly placement of columns, but after having placed our bins and all conveyors on the floor, plus all the rest of the paraphernalia used in a layout-packing-shipping routine (I'm speaking now only of the first floor), we then modified that layout only to the extent of permitting a somewhat reasonable and orderly arrangement of columns. We did wind up, though, with varying spans.

Then when we came to our second floor we figured that it would have to have a 250-lb. floor load capacity to carry the weight of our bulk stock.

When to Spend?

Construction of the second floor, obviously, was a problem for engineers, not amateurs. But we knew from our studies that tons and tons of merchandise could be lifted very, very cheaply so that even though we were going to lift 75 per cent of our merchandise to the second floor, which lifting would not be necessary if we had our bulk stock on the first, the per-ton cost of this lifting over a period of 50 years would be relatively small.

We were planning on using hydraulic lifting equipment because (1) its operation was so much cheaper and (2) it

could handle far heavier capacities than cable. Additionally, it has no cable stretch (which means jockeying the elevator when you want to get a fork lift truck on or off) and we wouldn't lose any vertical space in a loft, as would be the case with a conventional cable type elevator.

Again, we knew the installation of hydraulic elevator equipment came a little higher than the conventional cable type, because if we were going to go a total of three floors a deep shaft would have to be dug in the ground. But we were thinking that this building would last us perhaps 50 years and amortize that initial cost over 50 years, and in no time at all the operating cost would more than pay for it.

Add to that the fact that we wouldn't have a useless elevator shaft running through the top of the building (which was unsightly and a waste of space if a fourth floor were to be added), and we didn't see how we could help but come out in the clear.

We worked out man-hour cost comparisons with what was required to handle a first-floor bulk warehousing routine as opposed to our idea of a second floor operation and again the comparison was in favor of the extra cost to build a heavier second floor.

Incidentally, we submitted the complete plans to some large contractors and asked them to give us cost estimates on the construction of a building where the columns were all evenly spaced and the second floor carrying capacity was designed for only 150-lb. floorload. You will gather that by

this time our management had been made aware of what we were doing, for the model was so large that they couldn't help but notice that something was being built.

Since they had gotten into the picture and saw what a complete job was being done, our management contacted friends in the two companies mentioned, and in view of the possible future business these two firms went into quite a little detail in submitting their bid and blueprinting our plans.

The bids which came back showed a little less than five per cent increase would be required in the cost of construction to build the building with our unevenly spaced columns and the heavier second floor construction.

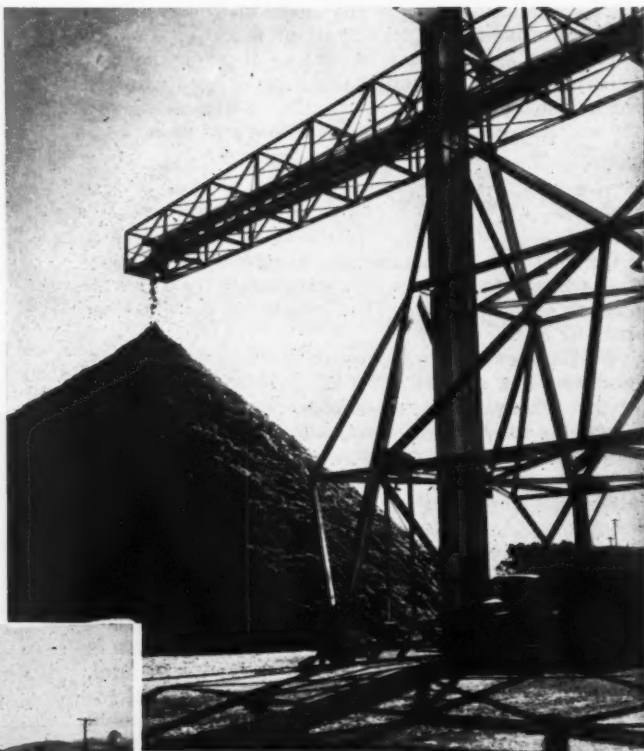
On further analysis, the two construction companies decided it would make better sense and future resale value to construct the entire building with 250-lb. floor load capacity (not necessarily the third floor 250-lb., though), and if this were done they said the five per cent differential would be cut down even less.

So, everything worked out for the best. Administrative management is satisfied because they got a truly functional plant and good value for their money. Operating management is satisfied because we got what we wanted, and everything is "knit to fit."

Net result is an efficiently laid out plant, neat looking, with a minimum cost of maintenance and operation, and far more productive per square foot than previous quarters.

CLEVER M-H for COTTON and CONCRETE

RIGHT: New type cotton seed piler at Phoenix, Arizona, plant of Producers Cotton Oil Co. runs along tracks and stacks seed to 50-ft. height for distance of 120 ft. on both sides of tracks. Trucks unload seed onto elevator conveyor belts, which deliver it to top conveyor and thence to piles. Capacity is 80 tons per hour. Credit for idea and erection of piler goes to Consolidated Western Steel Corp.



LEFT: Fleet of White 3000 concrete mixer trucks put into service by Consolidated Rock Products Co., Los Angeles, handles more concrete faster. Reasons: New method of weight distribution appreciably increases legal mixer capacity, and power steering gives better maneuverability on construction jobs.

MATERIALS HANDLING

should be the mother of

PLANT DESIGN . . .

When doors are too small, docks the wrong height, columns in the way, what hope is there for real efficiency? Listen to the reports and experiences of these vendors

Chas. H. Day
Chas. H. Day Co.
Portland, Ore.

WE RECENTLY had an experience in Portland, where the entire matter was left by the owners to the architect. We met with the architect and went over the situation carefully with him, but instead of having a minimum of 24 columns he had 96 in the same space and certainly has not proven of any benefit to the customer. His main reason was the extra cost would be too great. We pointed out the cost would be a continuous one to the customer as it would be necessary for them not only to dodge the columns with their equipment but it also gave them poor space for their product. We believe that this is an education long past due and should be directed principally to engineers and architects. They should recommend such designs that will be of long benefit to their clients rather than just thinking of the immediate cost.

We might say in this connection the Timber Structures in Portland, Ore., have developed structures which practically eliminate posts in the much larger than average buildings. We understand it is nothing for them to furnish trusses that will span 100 ft. and still give proper support for their roof and since it is more economy for single floor buildings, we believe such structures should certainly be recommended.

Aldon J. Anderson
Equipment Supply
Salt Lake City, Utah

WE THINK ARCHITECTS need the information your proposed article would contain. We would like a marked copy of the issue containing your article. We suggest you include the comment that if possible warehouse doors, elevator doors, also freezing room doors, should be made with 7-ft. doorway clearance to permit standard fork trucks,

with collapsible height of 83 in. to enter. Freight elevators should have capacity of 1,000 lbs. The first occupant or possibly future tenants would have or may purchase fork lift trucks, battery powered, of say 4,000-lb. capacity, and with weight, complete with batteries, around 8,600 lbs., without a pay load.

R. G. Zilly
Stephens-Adamson Mfg. Co.
Aurora, Illinois

IN ANSWER to your request for information on the things architects overlook in designing buildings for efficient materials handling, we can say—space. This is particularly true in pits where excavation and concrete costs tempt the architect to cut down on space at what seems to be a considerable money saving. Later, when machinery is installed, maintained and repaired, the space saving is wiped out by erection difficulties, etc.

W. B. Larkin, Steel Buildings Div. Manager
Butler Manufacturing Company
Kansas City, Mo.

TWO THINGS should be determined before building design can be established. First, the most economical method of handling the material and then the most satisfactory equipment that can be selected. It is this equipment, be it mobile, conveyors, or what have you, that should affect the design of the building. Size and type of mobile equipment will determine aisle width; method of storing and pallet arrangement and size will determine column spacing. Conveyors and power hoists will affect the bents through their superimposed loads.

To sum it up in a few words, the building should be designed around the most efficient materials handling system that can be developed for that particular material.

Another point to watch is that conditions vary greatly

between production and storage areas with the resulting effect on design.

The following will list a few points which should receive considerable attention:

1. Doors should be wide and high enough to take the largest equipment considered and their loads.
2. Truck docks at proper height to match bed height.
3. Sufficient turning area be provided to permit easy right angle parking of longest highway trailers.
4. Provide railroad docks with adjustable ramps to line up with variable floor heights encountered in railroad cars.
5. Provide excess aisle width on both truck and railroad docks.
6. Equip all doors used by mobile equipment with electric door openers with remote control.
7. Provide smooth and durable floors and roadways. This will reduce maintenance and tire wear and speed up flow of material.
8. Ramps should have gentle slope. Steep ramps reduce size of load, increase power consumption and slow down the equipment.
9. There is often one thing overlooked, yet it greatly affects the over-all efficiency of the material handling system. A well-equipped area centrally located as regards the operation of mobile equipment should be provided for storage and repair work.

Robert H. Griffin

**Glen L. Codman Company, Inc.
Oakland, California**

UNTIL VERY RECENTLY we have found that it has been common practice to proceed with the design and erection of a warehouse or manufacturing plant without any thought as to accommodating of material handling equipment. I might state that comments in this letter refer to the use of industrial fork lifts, towing tractors, etc. While it is intended by the new owner of a building to install modern material handling equipment, he is prone to leave consideration for equipment to the very last. Accordingly they frequently wind up with a nice new building and then find themselves trying to cram a material handling system into the structure.

It is our firm belief that anyone who is planning to erect a new plant should give first consideration to the equipment and processes which will take place in this building, particularly the material handling activities, and then design the building to house the activity.

As a result of putting the cart before the horse, it very frequently develops that when we are called into the picture we find no provision is made for adequate overhead clearances, door widths and heights, loading docks of adequate width, etc.

We have noted a change in the past couple of years and are more and more frequently being called into conferences with the building designer on matters described above.

Inasmuch as it isn't practical to set forth exact requirements for the reason that different buildings and different operations call for certain modifications, I would prefer stating that people who are planning to build new factories or warehouses should confer with the material handling people sufficiently in advance so that costly changes could be avoided.

For example, most warehouses would be more useful from a material handling standpoint if they were built on ground level, thus allowing the fork lift truck to move easily in and out of the building. It is becoming less and less necessary to have truck height loading docks when you consider the fork lift can take a load off any truck from the ground and proceed into the warehouse easier than the fork lift can go into the highway truck. Where railway facilities are indicated, the siding can be depressed to floor level or if this is not practical, a loading dock with an adequate ramp is frequently the answer.

Regarding ramps, provision should be made to keep the percentage of grade as low as possible and should not exceed 10 degrees for continuous ramp work. Ramps should be built sufficiently wide to allow safe movement and should be protected with curbs.

Where truck loading docks are necessary, serious consideration should be given to some form of permanently installed loading ramp, either mechanically or hydraulically operated which will permit adjustment of elevation of the ramp to meet various truck heights.

All doorways through which fork lifts are to be operated should have minimum clearances of 8 ft., and preferably 10 ft. Care should be taken to keep electrical wiring, sprinkler systems, and other overhead services above the truck heights.



◀ *"The heck with 'em.
Let 'em fire me and get
a mountain goat."*

*"Why should I try to
save dough for these
birds? Next time I'll
make five trips out of
it."* ▶



Floors should be designed with sufficient loading capacity to accommodate moving material handling equipment and columns and bays should be laid out to permit optimum use of the floor space for pallet loads. Loading docks should have sufficient width to permit fork lifts to move readily and should be sufficiently wide so that two trucks and their loads can pass without squeezing.

Where railway carloading and unloading is done with fork lifts, a wide loading dock is a very important factor in making a fast and safe operation. If it is not practical to build such a loading dock and the railway cars are located close to the side of the building, provision should then be made for extra wide warehouse door openings.

Freight elevators should be designed with sufficiently heavy capacity to accommodate the easy movement of products and machine. Most freight elevator manufacturers today offer special advisory service in this regard. Building owners are too prone to disregard the freight elevators as one of the most important pieces of material handling equipment in the building.

Last but not least, provision should be made for space to park and service the industrial trucks. This should either be a separate storing or a special room or location in the building where the trucks can be parked when not in service and where they can receive preventive maintenance and repair attention.

J. N. Meade
Denver, Colorado

AS TO COLUMN spacing, few as possible not closer than 20 ft., c. to c.; aisle width varies with type of equipment, a little extra width pays by speeding up operations; sprinkler system, many require at least 18 in. clearance from top of storage.

P. R. Hines
Stephens-Adamson Mfg. Co.
Portland, Oregon

A VERY OLD RULE is frequently overlooked and that is room enough to make repairs and replacements easily.

It's true, of course, with other equipment than straight conveyors, such as tractors, lift trucks, cranes, and par-

ticularly in warehouses rather than manufacturing divisions, the column spacing, design of trusses are not well suited.

The best plant design I have seen has always been by a combination of the design engineers and the operating men who are replacing an old plant. Or a consulting engineer who combines both plant design and operating experience and designs the plant on the basis he is going to operate it himself the first three or four months.

The approach to design is often different. My own approach is that the building is primarily to protect the process or manufacturing operation from the weather. Work out your process arrangement or manufacturing arrangement first, and then house it and make your buildings to fit, rather than the other way around, and try and fit the manufacturing end to the structure.

My principal experience in plant design has been for mining companies. The design of small plants, I believe, requires grouping for minimum attendance, and I design for a low labor cost and use all of the power I can use which will save labor. This means central control and one level plant.

A large tonnage plant is quite different and the operators are specialists, and you group the component parts together. Power savings become important. Large tonnage means you can use large units and you secure your labor saving that way.

P. W. Brown
Mathews Conveyor Company West Coast
San Carlos, California

WE DO RUN into difficulties occasionally in old buildings, primarily due to the fact that the design of the building was at a period when material handling was little known and little considered.

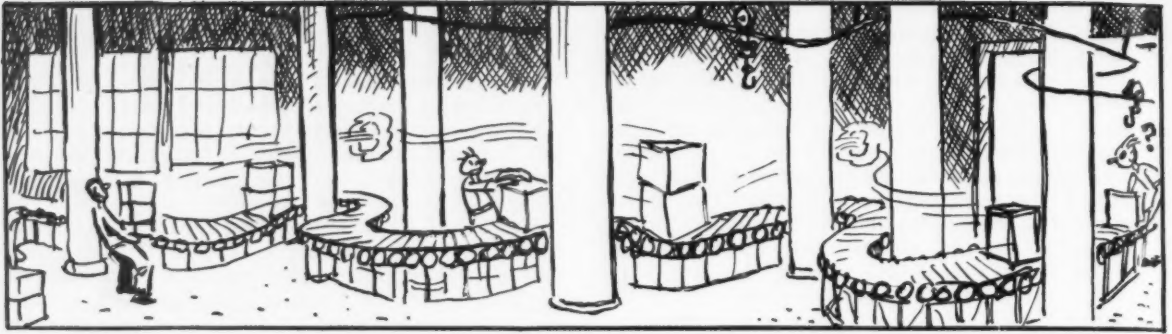
Design and capacity of roof trusses: Many times we find that truss design is such that it will support no additional weight other than the roof load it is supposed to carry, and for a little additional expense more strength could be built into a truss to provide for the possible installation of the equipment to be suspended. Also, it would be desirable to consider, if possible, the design of a truss which would permit running conveyor lines above the bottom chord, through the truss members, and in the design of the truss



“&\$%*” pennypinchers! That’ll teach ’em to build low doors when they want high speed freight.”

“Oh well . . . There goes that hundred bucks they saved on the sprinkler installation.”





**Round and round the little box goes. Where it'll drop, nobody knows.
(And they thought they saved dough when they built this plant.)**

incorporate a reasonable clearance in this respect.

The use of ceiling inserts is something that should be considered. Many companies make a standard practice of putting inserts in the ceiling in flat slab concrete construction, to avoid the necessity of later on having to drill holes to fasten hangers and brackets.

Another point which would be worthy of consideration is the location of sprinkler pipes, steam and water mains.

We have at various times encountered difficulty in flat slab concrete construction when it is necessary to cut floor openings. Due to the pattern arrangement of reinforcing steel, it is sometimes impossible to make these openings at the proper point, due to the limitations set by the reinforcing steel pattern necessarily required to give the proper strength to the floor. What could be done about this is a good deal of a question, as there are certain structural limitations involved by which the architects and engineers must be governed.

Stanley E. Morris

**Stanley E. Morris Company
Los Angeles, California**

ALL OF US in the material handling industry have seen the tragedy so often of an industrial building being designed and constructed without planning the handling system, so that full usefulness of modern handling equipment is not possible.

We, as a firm, have been preaching the idea of consideration of handling before building.

An industrial building is after all only a cover, to protect processing and handling to produce better and cheaper, so first consideration should be given to what is to be done and how in a plant. All too often industry will have a building designed just to be attractive and use space fully without consideration of the handling problems involved.

To cut material handling to the lowest possible cost and to make production most effective, we encourage our customers to think of the general broad points as follows:

1. In planning a new building, study carefully just what the handling problem will be—is the building for a specialized operation where the process will not change greatly or must consideration be given changing operation?
2. Have your architect consult with competent materials handling people as to requirements of handling equipment—if overhead cranes or conveyors are to be used, be sure the truss design is suitable for crane loads—will columns or knee braces cut working area of the crane, etc. If overhead type of equipment is to be used at any time, have your selected crane people work with and advise your architect.
3. Be sure your flow will be designed for loads to be

carried—have it smooth and level, allow proper column spacing for aisle and storage to use fully the advantage of pallets and skids.

4. Study your floor of material, be sure trusses and all supports are arranged to eliminate blocking of floor and to support crane or conveyor structures without having to add superstructure.

5. Be sure receiving, storing, processing and shipping departments are given the proper kind of room and space and are located in correct areas.

6. We have found it very important and helpful to have the planning for proper material handling to be done by production, warehousing, and plant engineering as a committee—too often each department will think they know all the answers and the result is a handling system that isn't coordinated. It pays to call in a firm who specializes in handling and many times your material handling distributor can give you very practical help—get the viewpoint of overhead handling people as well as floor handling firms.

These above points all seem so elementary and simple that they are hardly worth mentioning, but it is surprising how often they are overlooked.

James P. Kinney Co.

Los Angeles

IT IS IMPORTANT for the architect or building designer to be aware of the materials handling function—to know the sizes and types of equipment that will be used, their operating requirements, the size and shape of containers that the trucks will handle, optimum stacking heights of the containers, and wall and ceiling clearances required by local fire and safety regulations.

All building doors should be high enough to give 6 in. of clearance to the materials handling equipment. In the case of low headroom trucks, the doors should be at least 6 in. higher than the top of the operator's head.

Door width should permit pallets or skids to be carried through with at least 1 ft. of clearance. Where possible, make doors wide enough so that two trucks and their loads can pass while going through the door. Also, it is recommended that automatic door openers be installed in preference to swinging doors for safety.

Where possible, do not have doors open directly onto ramps. Provide a landing at least the length of the truck and its load before the incline. Ramps should be kept straight; if it is necessary to curve them, provide landings at suitable locations.

Ramps should never exceed a 12 degree incline for safety, even though the trucks can operate on steeper ones. Make ramp's surface rough finished (concrete) with side curbing.

Reinforced concrete flooring of the slab type is preferred over planking for more even distribution of the load.

If building has elevators, make sure they have sufficient capacity and height to permit entry of materials handling equipment without excessive maneuvering. And make sure that the floor load limits (*important*) are the same at the entrance of the elevator as they are throughout the rest of the room.

If perishable material is handled, canopies or a roof should be provided so that operations can continue during inclement weather.

If the material handling equipment is gas-engine-powered, provide suitable ventilation for exhaust fumes. If electric trucks are used, design the plant electrical system to permit location of truck battery charging equipment.

For hoists, there are so many variables (type of build-

ing construction, available steel, types of cranes to be used, spans, capacities) that it is difficult to generalize on recommendations. For machine shops, or where heavy parts are handled, use a hoist for all material exceeding 35 to 50 lb. in weight. Jib cranes can be attached to vertical building columns to permit wide flexibility for machine loading and unloading with either hand or electric hoists. This generally imposes no undue stresses on vertical columns.

In unloading area, where hoists are used, make sure that they have access to all storage racks—using either a bridge or an overhead monorail system. In computing the strength of supporting members, of course, add the weights of the bridge, hoist and maximum load before making calculations.

In designing monorail system, be careful of turning radii—check manufacturer's specifications.

BOOSTER CABLE for MONORAIL SYSTEM

CONSTANT FLOW of materials (as provided by powered overhead trolley systems) is not always the best way to move those materials. Sometimes it is desired not to have these parts moving continuously, particularly where independent handling of certain parts may be required at specific points of fabrication or assembly or finish.

Hand-pushed or gravity monorail systems solve this problem nicely, in connection with a booster conveyor used to lift the loads from one level to another. A typical example of this system is installed at Menasco Manufacturing Co., Burbank, Calif.

A monorail trolley carries aircraft landing gear assemblies. These 500-lb. assemblies leave the hand-pushed monorail system in the paint and finishing building, and for a distance of 50 ft., and up a 2 degree 20 minute incline, the landing gear are boosted to the necessary elevation, at a speed of 60 feet per minute.

The loaded carrier is automatically picked up by the cable conveyor pusher bar. Spaced at 10-ft. centers, assemblies arrive at the door of an adjacent building where sufficient acceleration at the discharge point gravitates the carriers to their final receiving point.

After removal of assemblies from monorail trolley, the carrier is connected to the overhead cable conveyor and is returned to the starting point of the system for reloading.

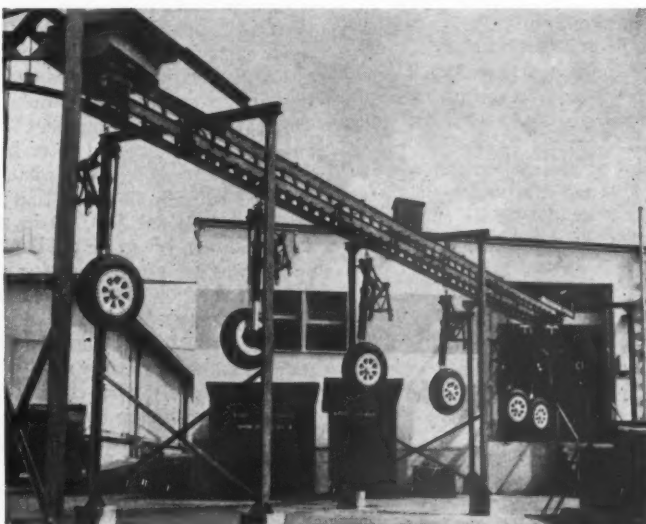
The Buschman Cable Conveyor with a bottom roller guided load bar has an extended pusher bar engaging standard monorail trolleys. No special lugs or arms are needed on the trolleys. The offset side pushing effort of the cable is balanced by side guide rollers on the load bar of the cable trolley.

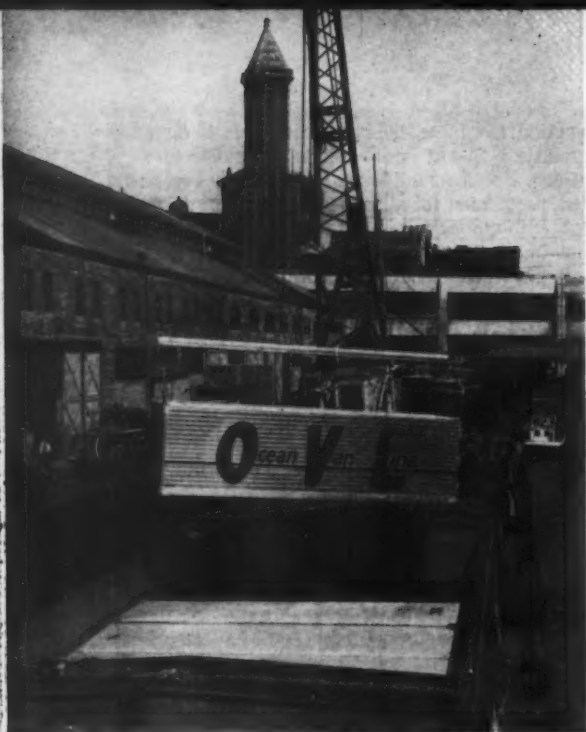
Hand-pushed systems have practical application in many widely diversified industries. They are now being used extensively in the manufacturing and cleaning of Venetian blinds. Units of overhead cable conveyors are usually single loops or two parallel loops set about 6 ft. apart so that the material may

be hung from a trolley on each line and hand-pushed some 20 or 30 ft. for processing or cleaning, after which the empty trolleys are brought back along the rear sides of the loop for re-use.

Sheet metal parts are being dipped in cleaning and painting operations and hand-pushed to drying and successive operations. Castings are cleaned and sprayed along manually pushed lines. This type of installation suits itself well to temporary operations where the initial investment must be kept to a minimum. Standard components of cable conveyors are used so they can be available for any future powerizing.

AT A SPEED of 60 feet per minute, aircraft landing gear assemblies each weighing 500 lb., travel by booster cable conveyor at Menasco.





OCEAN-GOING VANS

by-pass dock handling steps

New Alaska service takes big step forward in reducing ocean shipping costs by swinging entire trailer vans into the ship's hold

ANOTHER STEP in simplifying ocean freight handling which holds promise of equalling or even surpassing packaged lumber in significance has been taken. It is being employed between Puget Sound and Alaska, and consists of the lifting of van bodies off the trailer chassis on the dock and swinging them aboard ship for stowing in the hold or on deck.

Easier, Faster, Cheaper

This eliminates several customary movements, the unloading of goods from land carrier to dock, from dock into the ship and stowing inside the hold. In addition to reducing the cost and speeding things up, it also makes damage less likely and almost entirely eliminates pilferage.

(High dock handling costs are described in another article in this issue as a big obstacle to the progress of water shipping in competition with rail and truck hauling.)

At point of destination the process is reversed, and the van bodies are loaded back on the trailer chassis or on rail cars. The operators are Ocean Tow, Inc., and Ocean Van Lines. Use of barges specially designed for efficient handling of general cargo over the same route by Ocean Tow was described in *Western Industry* in August, 1948. Packaged lumber methods were set forth in the July, 1949, issue of *Western Industry*.

Accessorial Charges Included

This ocean trailer service is also historic in Pacific Coast shipping history in that it has provided a "package

deal" covering all accessorial charges as well as transportation. Failure to provide such a combination arrangement has been widely asserted by shippers to be one of the main causes why trans-Pacific freight has been increasingly diverted to Gulf and Atlantic ports.

Railroads, steamship lines, terminal operators and shippers have debated this question for years without finding a means of informing the shipper beforehand what it is going to cost him to move his freight through Pacific Coast ports.

Door-to-Door Charge

At the Western Transportation Conference in San Francisco in 1947 (see *Western Industry*, April, 1947) when top brass from all groups were present, one of the glaring examples cited was that of an automobile manufacturer who learned after his shipment was far out on the Pacific, and after he had billed the consignees for what were believed to be final costs, that there was an additional \$10,000 in accessorial charges yet to be paid. A committee was set up to work for a harmonious solution of the problem and there the matter apparently ended.

Ocean Van Lines and Ocean Tow, Inc., operators of the new service, have provided a door-to-door charge, covering marine insurance, wharfage, handling, loading, unloading and terminal charges. Also, one pick-up and one delivery for each shipment within the city limits of towns and cities served by the shipping company are included in the rate.

The U. S. Maritime Commission gave its approval to the new service on June 24, and the first movement of common carrier cargo under commission-approved rate was on July 8. Military and contract cargo has been moving by this method for some time.

Designed to be Cargo

Trailer vans for the new service were designed specifically for Alaskan cargo shipments. They are of monocoque construction with the strength in the outer sheath rather than in the framework; are 30 feet long with a capacity of 1,545 cubic feet. Weighing 4,630 lbs., they carry approximately 25 tons of payload. The vans are made by Brown Trailers, Inc., of Spokane, and 200 of them are being provided at a cost of \$1,600,000.

Lifting loops for picking up the van are integrally welded to a vertical pipe at each corner top, and tie-down loops are welded to the other end of the pipe at each bottom corner. Flanges on the four upper corners permit vans to nest upon each other.

Safe for Perishables

Each van is equipped with individual heating and cooling units, with a temperature range of 60 degrees F. to minus 10 degrees F. Electric power for temperature control is from special circuits installed on vessel decks and in the holds, connecting with each trailer van.

Special generating units on trucks, docks and on the government-owned Alaska Railroad flat cars will make specified temperatures possible

throughout shipment. This provides more flexibility than refrigerated ships, as each van can have its own individual temperature. Refrigerator units are manufactured by the U. S. Thermo Control Company of Los Angeles, and the trailers on which the vans are mounted by Pike Trailers, Inc., of Los Angeles.

Experiments for the Army in shipment to Alaska of refrigeration and chill-room cargo by the trailer-van arrangement have proved so successful that movement of such perishables will be an important part of each cargo.

Sailings Weekly

Three ships have been provided for the service. They are the Alaska Spruce, the Alaska Cedar and the Gadsden, the last named a knot-type ship being a newcomer to the Seattle

THE "GADSDEN" presents an unusual sight with its rigging for lifting locomotives, which now comes in handy for picking up ocean-going vans.



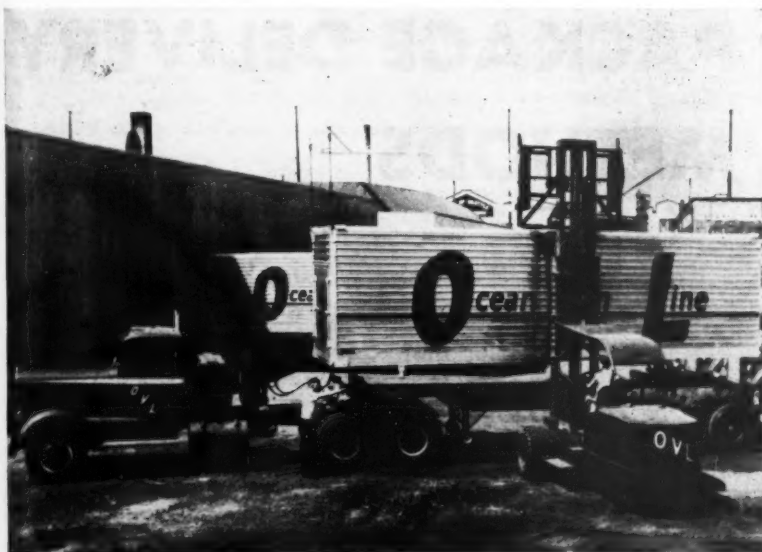
waterfront. It is an unusual sight with her rigging for lifting locomotives. The lift capacity is 110 tons, and the Gads-

den was used for carrying steel steam locomotives to France, Belgium and Turkey between 1946 and 1950. Weekly sailings have been scheduled from Seattle and Tacoma to Anchorage and Seward.

In most instances, the Ocean Van Line will not handle trucking ashore, but regular trucking companies will hook onto the trailers when they are unloaded at destination.

The Man Behind It

Felix Schlickeisen, president and general manager of Ocean Van Lines, is president and general manager of the Portland Tug and Barge Co. Also formerly with the Morrison-Knudsen Construction Company in Alaska for 16 years, as construction project manager for a number of large installations including Northway, Naknek and Cold Bay. During World War II, he was a civilian construction technician with the Army Engineers, assigned to dock construction in the Aleutian chain.



On land, and at sea . . .

ABOVE: Ocean-going van being set in place on trailer chassis by mobile lifter at Seattle.

. . . perishables are safe.

RIGHT: Refrigeration unit installed in truck-trailer vans enables successful carrying of meats, lettuce, celery, tomatoes, avocados and other perishables.





INCOMING PACKAGES (left) begin primary sorting. Belt speed is 75 fpm. Belts shown here are 24 in., but New York and Chicago use 30 in., due to trend to larger packages (diagram below).

Pacific Coast pioneers PACKAGE DELIVERY METHODS

CONSOLIDATED package delivery for retailers and wholesalers calls for a system all its own, involving intricate mazes of belt conveyors, slides, sorting cages, loading and unloading docks and routing systems. Because the methods used may have applications in apparently dissimilar industrial fields, the Los Angeles operations of one package delivery company are here described.

Began in Seattle

The only nation-wide organization in the business is a company which had a modest beginning in Seattle in 1907, and gradually expanded over the entire Pacific Coast. In 1930 it hopped clear across to New York and since then has been filling in intermediate areas.

Founder was James A. Casey, who is president of the company today. It began as the American Messenger Company, located "under the sidewalk" at Second Avenue South and Main Street. A short time later James Casey's brother, George W. Casey, now president of the Pacific Coast operating companies, joined up.

Consolidated delivery began in 1918, when three Seattle stores decided to expedite service and cut delivery costs by turning their delivery

problem over to what is now known as United Parcel Service. This was the beginning of expansion, which has required constant research, improvement and invention to adapt existing facilities to growing needs and to prepare for new operations.

Oakland service was begun in 1919; Los Angeles in 1922; San Francisco in 1925. Portland and San Diego were added in 1927. This gave coverage of important cities throughout the West Coast.

The Company's most ambitious move—into the New York area—was made in 1930. At first, only two metropolitan New York stores and one in

Intricate sorting, conveying and routing systems now in nation-wide use first developed in the West

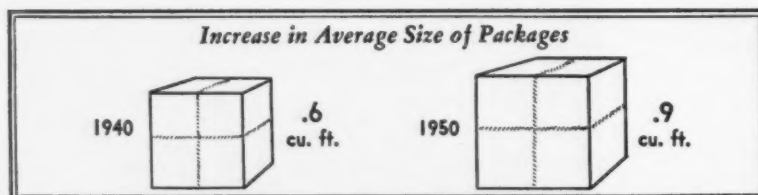
Newark, New Jersey were served. Today, virtually every important department store and specialty shop in this area is served by UPS.

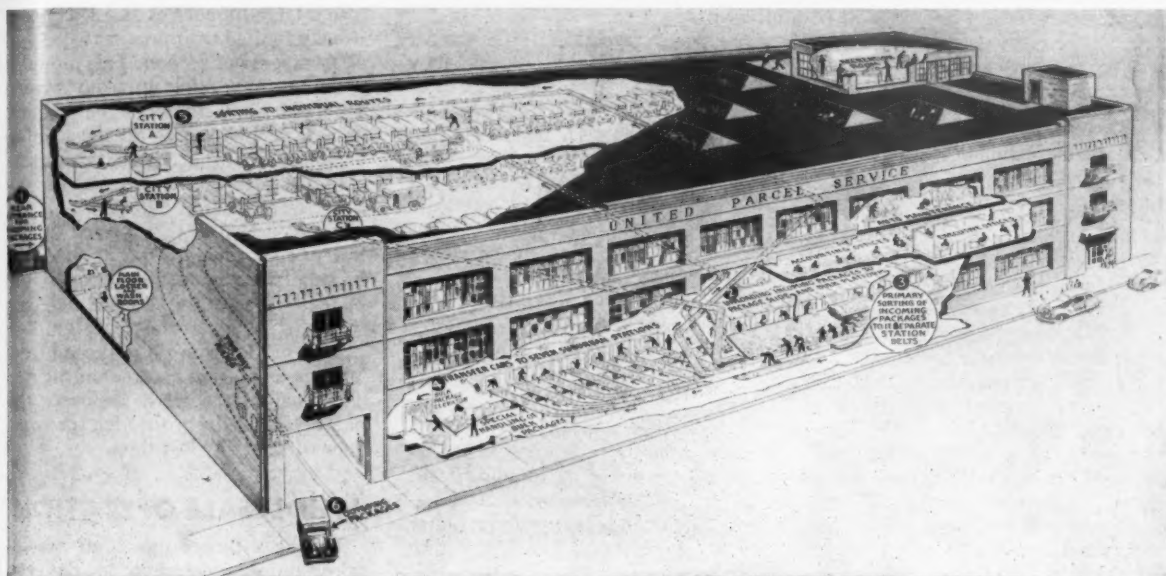
Cincinnati was added in 1934; Milwaukee and Philadelphia in 1938. Service to Chicago was begun in 1940; Detroit in 1944; Minneapolis in 1946; and Pittsburgh in 1950.

Wholesale Service Also

The largest operation of United Parcel Service on the Pacific Coast is presently conducted in Southern California. With Los Angeles the hub of this operation, service is rendered for all of the large department stores and many fine specialty shops.

In addition, United Parcel Service serves some 2,400 wholesalers and manufacturers in the Los Angeles area, providing overnight service to the entire Southern California area from Santa Barbara on the north to the Mexican border on the south and as far east as Redlands, Riverside and San Bernardino.





LOS ANGELES RETAIL OPERATION. Pick-up cars bring incoming packages in wheeled cages or loose loads to rear entrance (1) and drive inside to unloading dock. Cages unload into package slide (2) bulky and fragile packages sorted separately on bulk conveyor (3) transferred in cages to elevator (4) for routing, while smaller packages are diverted to small conveyors, thence to line haul cars for suburban delivery or to rear of building (5) for sorting into individual city delivery routes.

RETAIL OPERATION

Handling packages from retail specialty stores and department stores is the function of the Los Angeles Flower Street building of United Parcel.

In this operation, pick-ups are made regularly each business day at the smaller stores at a specified time late in the afternoon, and on a continuous basis throughout the day from the larger department stores. The packages are then sorted and routed by means of a combination slide and belt conveyor system to one of four delivery stations located within the building itself or to line-haul cars for distribution to various outlying delivery stations.

In designing the facilities, United Parcel Service engineers considered a number of factors, including:

1. Variations in the work load from day to day;
2. Differences in the size and weight of packages.
3. Protection of fragile and easily damaged merchandise.
4. Storage facilities to provide for a continuous flow of merchandise once the operation was started.

Loose Loads

Packages from the smaller retail stores and larger specialty stores are

picked up on a route basis as late as possible each day. Cars begin to arrive at Flower Street shortly before the start of the operation so that a backlog of packages may either be stored on slides, or the cars unloaded as needed to keep the flow of merchandise moving without interruption.

Cage Pick-ups

The packages at the large department stores are packed in wheeled containers, or cages, which measure 81" long, 66" high and 38" deep. Each pick-up car has a capacity of four of these cages. When the car goes to the

SORTING WHEEL used at Seattle. Standing where three of them converge, the sorter takes packages from receiving runner, sorts into compartments, then pushes button and compartments are whirled to right unloading position.



store it carries four empty cages which are exchanged for four full ones. These cages are then stored on the UPS platform until time for processing. It is possible to store approximately 70 such cages at one time.

Unloading, Primary Routing

Processing of packages may be compared to the production line at an automobile factory.

At the starting time, generally about 5:30 p. m., (although at Christmas and sale periods the time is earlier), the various crews are at their designated places: belt boys to help unload the cars and cages, routers to make the primary sort, people to load the line-haul cars, drivers to haul the merchandise to the outlying delivery stations, and markers and belt boys in the delivery stations to route the packages by sections and get them stacked in the various bins.

In the unloading function, the small packages are placed on a large slide. When the slide has accumulated a sufficient volume of packages, the routers begin work, sorting the packages on to

the 12 conveyors which carry them to their destination.

The sorters average 1,100 pieces per hour and the work load is controlled by the number of sorters at work. The bulky, heavy and fragile packages are placed on a 40 inch wide belt and sorted to their respective stations. The slide and bulk belt are kept full by a continuous feeding of packages from either the pick-up cars or the department store cages, which insures a steady flow of merchandise.

Delivery Station

Conveyor belts carrying the packages from the central or primary sort empty into accumulation slides, for transfer by line haul equipment to outlying stations, or into slides in the stations located within the building itself.

When enough packages are accumulated on the slide, the station router starts marking them by sections within that station's territory. The packages are stored in bins by these section numbers. The storing in the bins is done by belt boys who usually serve three or four bins each.

Each station's territory is divided into a large number of small sections, usually limited to approximately 35 to 40 packages per section. This provides flexibility in making up a day's work for the drivers, simplifies the training of new people, speeds up the loading operations, and enables station adjusters to quickly answer requests for delivery information.

Each section is then placed in delivery order, generally during the night by people experienced with each street in the entire station, 40-line delivery sheets written, and the packages then placed in the cars with the address label up and facing the front of the car. This enables the driver to locate the package for delivery through the front door without any lost time.

WHOLESALE OPERATION

Packages picked up from wholesalers and manufacturers for delivery to stores and other business firms are handled at the 9th Street building of United Parcel Service. Pick-ups are made regularly each afternoon from

FIRST STEP in the wholesale operation (below). Pick-up car backed for unloading into the line of cages which serves as a reservoir of packages.



VIEW OF DOUBLE LINE of cages (above). Routers stand in aisle, remove packages from top shelf of cage line on left for sorting into pigeonholes (each representing a delivery station) in cage line on right. Bulky or heavy packages placed on lower shelf of left cage line, for marking and sorting in a special aisle.



RETAIL OPERATION again. A maze of conveyors is required to take packages to their stations. Variable speeds are used on station belts, from 20 ft. to 30 ft. per minute, never faster, because sorters must read addresses. Pitch of belt cannot be steeper than 19 deg. unless special belt is substituted for the ordinary smooth belt.



such firms by large pick-up cars which begin to arrive at 9th Street just prior to the start of the sorting operation.

Unlike the Flower Street operation with its maze of slides and conveyors, the type of sorting operation at 9th Street embodies the use of moving cages with pigeonholes as the medium of segregating packages by stations.

Flexibility Required

In designing these facilities consideration also had to be given to providing for a system flexible enough to provide for work load variations, for differences in the size and weight of packages, for protection of fragile packages; and for storage facilities to provide for a continuous flow of merchandise.

As a sorting principle, the pigeonhole stands alone. The 9th Street operation actually consists of nests of pigeonholes mounted on casters and pulled along. Each nest constitutes a cage nine feet long, 30 inches wide and six feet high, pulled by an overhead chain carried on an I-beam eight feet above the floor and operated by a variable speed drive.

Storage Reservoir

The pigeonholes are arranged in two series, one an endless storage line to serve as a reservoir from the pick-up cars on one side and as a moving supply for the primary sorters on the other. The only segregation made from the pick-up cars provides for parcels being placed on the upper shelf and bulk on the lower.

Sorters work within a three-foot aisle parallel to the storage cage line

and the subdivided cage line, each cage in this line having its entire nine-foot lower shelf reserved for bulk merchandise and its two upper shelves divided each into five pigeonholes. Thus each subdivided cage consists of ten parcel pigeonholes each 20" x 21" x 26" or about 7 cubic feet and one large bulk pigeonhole of about 45 cubic feet.

If each pair of these cages are regarded as a unit, 20 direct station sorts are possible. If three cages make up a unit, there may be 30 direct station sorts.

Provides for Future

This assures flexibility in being able to sort to additional stations which may be added to increasing volume. It is true that a primary sorter will not always have the proper pigeonhole directly in front of him, but in actual practice and by the law of averages the rate of sort is retarded very little.

At the present time United Parcel Service is segregating packages to 17 different delivery stations. One such station which handles deliveries within the major portion of Los Angeles proper, is located within this building itself, the remaining 16 being scattered throughout the Los Angeles and Southern California area.

Special Advantages

A further explanation of the bulk handling system should be of interest. As noted, the bulk is placed on the cage floor by the pick-up unloading crew.

One definite advantage in this is gained by the fact that the bulk is placed at the most convenient level for

its disposal, namely, on the cage floor with the addresses facing outward. The parcel sorters give it no attention. The bulk marker and as many assistants as are required, working in the marking pit at the south end of the building, mark the station identification under the label and swing it across the aisle at the same level to the lower shelf of the subdivided cage line.

All subdivided parcels and marked bulk pass around and along the rear of a series of line-haul loading positions. The line-haul car loaders remove bulk and parcels from the passing cages as needed, making full use of belt conveyors inside the truck bodies, or of "roller skate" portable conveyors.

Any parcels not removed from each cage in passing make a round trip again. The great capacity of the cages cares automatically for these fluctuations. The storage feature of these cage lines is of interest. The primary storage line of 33 cages has a storage capacity of 4,860 cubic feet, and the sorting line of 56 cages, a capacity of 7,560 cubic feet.

Next-Day Delivery

The 9th Street operation normally starts at 5:00 each evening and in a three to three and one-half hour period the entire operation is completed, with line-haul cars on their way to the various stations that same evening or during the night. This assures next-day delivery to the entire Southern California area from Santa Barbara on the north, San Diego and the Mexican border to the south, and east as far as Redlands, Riverside and San Bernardino.

YOUR M-H PROBLEMS *have their roots in the field*

By

GRANT JOHNSON

Manufacturing Department

C. E. BRAUN

Department on Organization
Standard Oil Company of California

and

WILLIAM H. DENNICK

Principal
McKinsey & Company

What looks like a problem in your plant may really be caused by a situation somewhere else — Consider all elements, particularly external factors, if you want a truly integrated solution to your material handling

THE GOALS

The following specific improvement objectives were established for the operation of the new facilities of the package division:

1. *To provide faster service.* Could the order-processing cycle be shortened? Previously, seven days was an absolute minimum.

2. *To give more dependable service.* Could the number of orders "shipped short" be reduced? Further, could assurance be given that completed orders would be shipped on specified days—according to a predetermined schedule?

3. *To retain minimal warehouse stocks.* Could the 30- to 45-day inventory of most packaged items be reduced?

4. *To maintain level work loads.* Could the formerly unpredictable fluctuations in work schedules be eliminated in:

- (a) Oil and grease manufacturing,
- (b) Container filling,
- (c) Stock order picking,
- (d) Shipping,
- (e) Clerical operations.

5. *To reduce operating costs.* Could monthly labor costs be reduced—particularly in order-picking and clerical functions—along with the achievement of other benefits?

THE SOLUTIONS

In appraising how to attain these objectives, it quickly became evident

MAJOR WAREHOUSING and materials handling problems that arise at a central warehousing and distribution point may be a reflection of shortcomings scattered throughout the manufacturing and distribution system.

The Standard Oil Company of California discovered this in an analysis of its Richmond Package Division operations. The real roots of materials handling problems were found: *Miles away from the warehouse—in the field, where order originated; in the planning and scheduling of manufacturing operations, and buried in procedures for accounting and control.*

This company's experience clearly demonstrates the importance of considering *all elements* affecting warehousing activities when appraising possibilities for improving materials handling operations. The solution to major problems is likely to be much broader than merely applying more or better mechanical methods or refining warehouse layout. In practice, the *physical* aspects of materials handling problems become minor—and even tend to dissipate—when the numerous external factors contributing to them are effectively dealt with. This was generally true at the Richmond Package Division.

The new package warehouse and grease manufacturing plant at Standard's Richmond refinery was built to replace obsolete facilities. Its modern manufacturing and materials handling equipment have been given wide publicity. Concurrently with the construction of these new facilities, it was realized that effective operation would require newly designed organizational and operating procedures.

This article describes the approach used in developing the equally modern operating concepts and procedures needed to assure successful operation and secure an attractive payout on this important facilities investment. A comprehensive analysis of all of the functions and procedures affecting package division operations was undertaken. Its purpose: To develop an *integrated* "operating plan" suitable to the particular conditions and requirements of the new facility.

that only *part* of the answer lay in developing more effective materials handling and warehousing methods and procedures. Many of the basic problem areas were beyond the responsibility and authority of those directly responsible for Package Division operations—or even the manufacturing department.

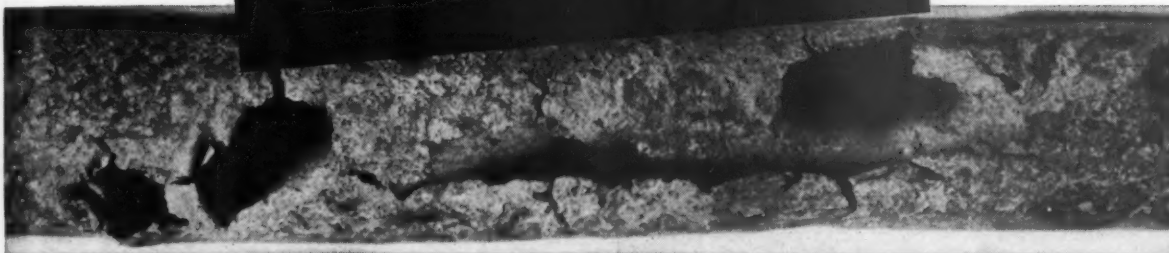
Ultimately, all of the departments whose functions and activities impinged upon effective utilization of the Richmond facilities participated in

various aspects of the study. The net result was a cooperatively developed "operating plan" which most nearly met the needs of all concerned.

The following six-point program for over-all integration of Standard of California's package operations was adopted.

Ordering practices of the field bulk stations were standardized and simplified. Preprinted order forms were developed which contained a complete listing of all authorized products and

research at work!



Photograph of a section of a failed tube showing excessive thinning and pitting of the outer surface. Note also the circumferential cracks.

CORROSION STUDIES CAN INCREASE THE ECONOMY OF COPPER ALLOYS

Copper and its alloys are notable for their resistance to corrosion under a wide variety of conditions. There are industrial applications where copper or the appropriate copper alloy should give an indefinitely long life, but where failure because of corrosion may result by reason of unsuitable design of equipment or improper control of environment. Further, there are many situations in which no commercial metal or alloy will have an extended life, but in which copper or one of its alloys possesses a combination of physical and chemical properties which render it the best obtainable material, when all factors, including ultimate costs, are taken into consideration. Hence correct specification becomes of great importance. Recognition of this by industry is responsible for the fact that the Revere Research Department devotes so much time to studying the corrosive effects of fluids and gases, and to preventive measures.

Recently a large manufacturer, who produces condensers as well as other equipment, reported that arsenical Admiralty tubes in a steam-jet ejector were failing after five years. This length of service is not too bad, but nevertheless such tubes often last much longer. Could we make any suggestions?

Seven failed tubes were examined for type of corrosion, metal and scale analysis. The facts were: outer surfaces were badly pitted and grooved with holes completely through in some areas; the inside surfaces were relatively untouched; cracking was circumferential, progressing from the outside; outer scale was largely cupric carbonates and copper sulfide; inner scale was calcium carbonate, cuprous oxide and some iron oxide. Microscopic examination of the cracks showed they originated in corrosion pits on the outside, progressing inward across grain boundaries, rather than along them. The transgranular path of fracture, together with other characteristics of the microstructure, definitely established the fact that the

failure was of the corrosion-fatigue type. The corroding pits on the outside created stress concentration points of weakness, from which the cracks originated. Eventually the localized stress exceeded the endurance limit of the metal and it cracked.

The conclusion was, therefore, that damage was from two sources—the first being excessive carbon dioxide and the other non-condensable gases in the steam, which caused the excessive pitting and thinning. It is not unusual to have these and other corrodants present in damaging amounts in the air-ejector system, whereas they are not injurious elsewhere. The second cause of failure was excessive vibration somewhere in the unit which was responsible for the corrosion fatigue failure.

RECOMMENDATIONS. The copper-base tube alloy that generally possesses the greatest resistance to the non-condensable gases responsible for the corrosion of the Admiralty tubes is 5% aluminum bronze. Re-tubing with this was suggested. It was also recommended that steps be taken to effect a material reduction in tube vibration by placing a baffle in the steam inlet. In addition, it was pointed out that many operators find it good practice to discharge the after-condenser drain to the sewer instead of returning it to the system. By this means, the amount of carbon dioxide, ammonia and other gases in the system can be substantially decreased.

* * *

It is interesting to note that the Revere Research Department, located in Rome, N. Y., was able to determine these causes and suggest remedies without ever having seen the condenser. This is the result of modern equipment, and long experience in studying the problems of corrosion. If you have a problem regarding the corrosion of copper and copper alloys, or aluminum alloys, why not take it up with the nearest Revere office? Remember, corrosion that is too rapid wastes both your money and our national resources.

REVERE

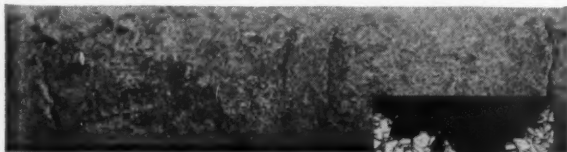
COPPER AND BRASS INCORPORATED

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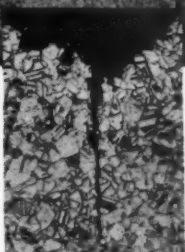
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Here the circumferential cracking of the outer surface can be seen.

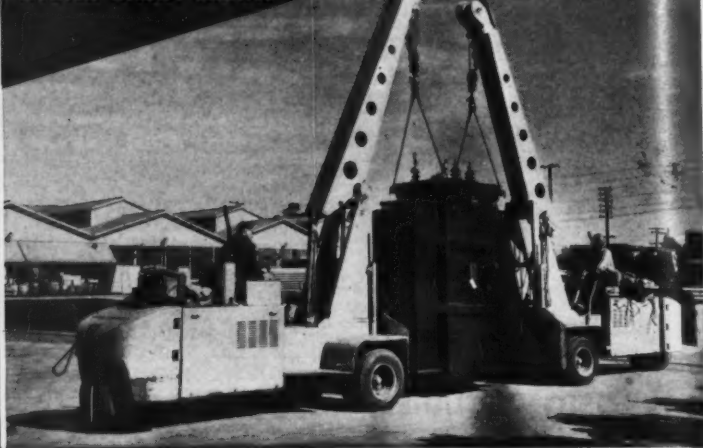
Photomicrograph of a section through a tube showing transgranular corrosion-fatigue crack originating from the base of a pit on the outer surface of the tube. Magnification 225X. All photographs taken by the Research Department of Revere.



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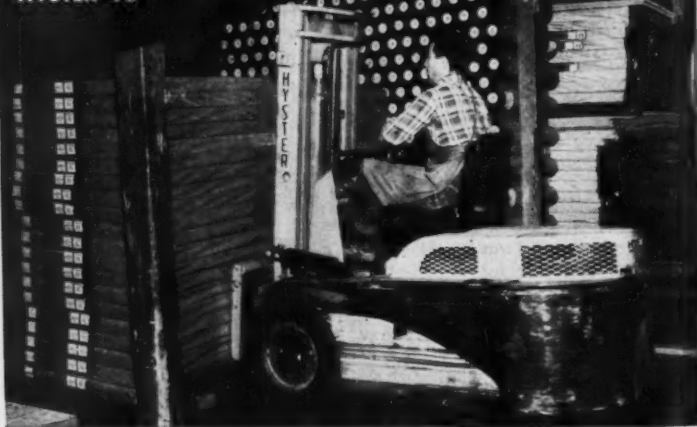
HYSTER COMPANY
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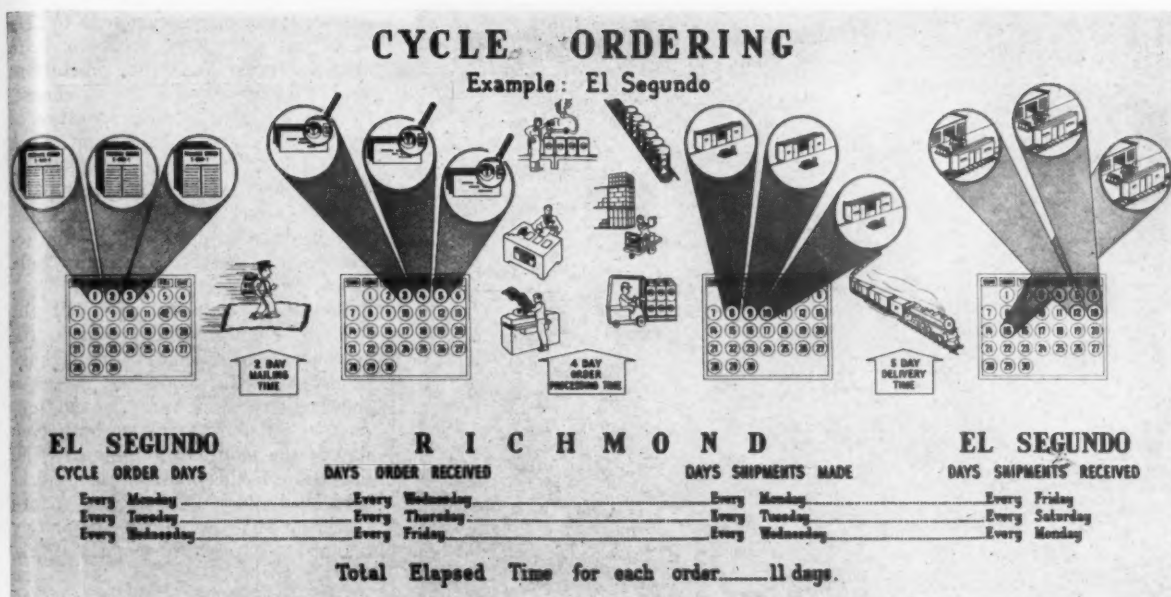


FIGURE 1—Cycle ordering, centrally planned for 700 field bulk stations, smooths out the work load for Standard's Richmond facilities and assures reliable stock replenishment for field warehouses, such as this one at El Segundo. Inventories cut more than half.

THE RESULTS OF AN INTEGRATED APPROACH

Standard Oil Company of California found that most effective use of the Richmond Package Warehouse and its mechanized equipment depended upon the coordination and integration of many related activities. As the result of such an integrated approach, the following accomplishments were achieved:

1. Order processing time was reduced from a former minimum of seven days to four.
2. Service was considerably improved. Not only were orders shipped more complete, but bulk plants could know with greater certainty when they would receive their orders.
3. Inventories were substantially reduced from the former 30- to 45-day supply to approximately a 15-day supply.
4. Unpredictable and widely fluctuating work loads were reduced or eliminated. This resulted in an ability to plan for level manpower requirements—a particularly significant benefit.
5. Substantial labor and clerical savings were effected in all operations of the Package Division.

package sizes in the package line normally ordered by a field station. The use of such forms—as the initial step in the integration of the packaging ordering and materials handling program—provided these advantages:

1. Uniform identification of products and container sizes. Clerical work and errors were reduced all along the line.
2. Standardization of ordering quantities—in terms of easily handled units. For example, if the bulk plant had normally stocked 50 cartons of motor oil, it was urged to order 48 car-

tons—a full pallet. This suggestion—of ordering in multiples of pallet load quantities as far as possible—was incorporated as part of the order form and greatly simplified the job of order picking and shipping.

3. Assistance in reducing “oversights” in ordering. The form provided a check list of fast-moving items, useful as a reminder.

Cycle Ordering

The concept of cycle ordering is similar to cycle billing found in many utility companies and department

FIGURE 2—Reserve stock area contains package items in full and tier pallet quantities, loaded at predetermined pallet spots. Order picking and shipping simplified.





Do you get steel strapping service like this?

HERE Bob Thomas, one of the Brainard Strapping System salesmen in New York, shows a customer how to strap a coil of perforated strip steel for shipment—quickly and securely.

Like other Brainard salesmen, Bob knows that *the proper use of steel strapping* is just as important as the strapping itself. That's why he spends a lot of time out in customers' plants—"showing how". And that's why he's fast on his feet when a customer needs a replacement tool, or strapping materials *right now*.

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WARREN, OHIO

stores. Its primary purpose is to help level out fluctuating work loads in manufacturing and filling operations and in the operation of the warehouse.

Figure 1 illustrates the operation of cycle ordering at a bulk plant. Each field bulk station is assigned a specific day or days on which it may place orders. Ordering frequency is predetermined, based upon the size and requirements of the particular bulk plant.

Through proper planning of the ordering cycle and adherence to the predetermined schedules, the package facilities at Richmond can expect a relatively constant number and tonnage of orders to arrive on any given day of the month. Having geared all operations to this predetermined workload level, the warehouse and manufacturing facilities can be adequately manned for processing paper work, manufacturing to order, filling from stock, and shipping the completed order within the allotted order processing time—in this case, four days.

Under this arrangement, "customers" can depend upon receiving their filled orders on a specified day, allowing for elapsed in-transit time.

Centralized Planning and Scheduling

Obviously, cycle ordering requires a high degree of coordination between the field bulk plants and the Richmond facilities. Moreover, advanced planning and detailed scheduling is essential to effective operation of the warehouse and manufacturing facilities.

Under the previous system, upwards of 30 different agencies were involved in some form of planning and scheduling. Each foreman, for instance, largely scheduled his own manufacturing and filling operation, set the level of warehouse inventories carried, and forecasted his manpower requirements.

To solve this problem, all such planning and control activities were centralized. The Centralized Planning Office now has responsibility for both long- and short-range planning of:

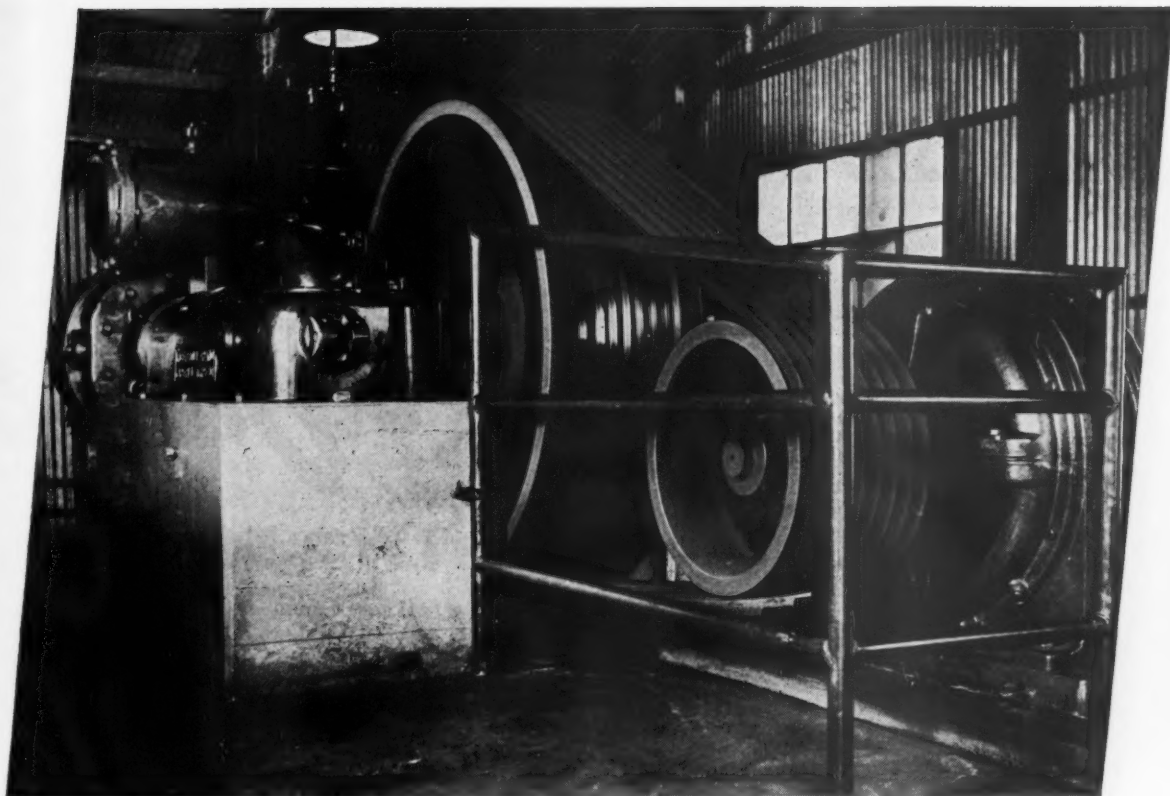
1. Raw materials, supplies, and finished goods inventories;
2. Labor requirements;
3. Transportation requirements.

Issuing and following up on performance under detailed schedules is also a function of this office. These schedules prescribe the sequence and time of manufacturing, container filling, stock-picking and shipping operations.

Tabulating Equipment for Control

The planning department needed accurate and timely information to ac-

Continued on page 69



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YOUR M-H PROBLEMS

... begins on page 62

comply its job of transforming facts and figures into realistic plans and schedules. Tabulating equipment was selected for this task.

The tabulating department provides daily order and inventory figures for realistic facilities planning, for stock control and replenishment purposes. It also prepares:

1. All detail schedules used in the various manufacturing, filling and shipping operations.

2. Order-picking cards showing the quantity of each item to be selected from warehouse stock to fill each order. These cards are presorted by customer, warehouse location, and type of routing before being forwarded, daily, to the warehouse foreman.

These presorted cards are used to route order pickers through stock sec-



FIGURE 3—Forward stock area contains broken pallet quantities stored on pallet racks. Here, an order picker consults his tab cards before picking the next item and placing it on the train.

tions of the warehouse in the most economical manner. In the forward stock area, for example, each batch of cards routes the order picker on one trip through that section of the warehouse. Along the way he picks all designated stock items—in card-by-card sequence—and transports them to the shipping area. The next batch of cards selected again directs him on a continuous tour through the forward stock area—without backtracking or crisscrossing.

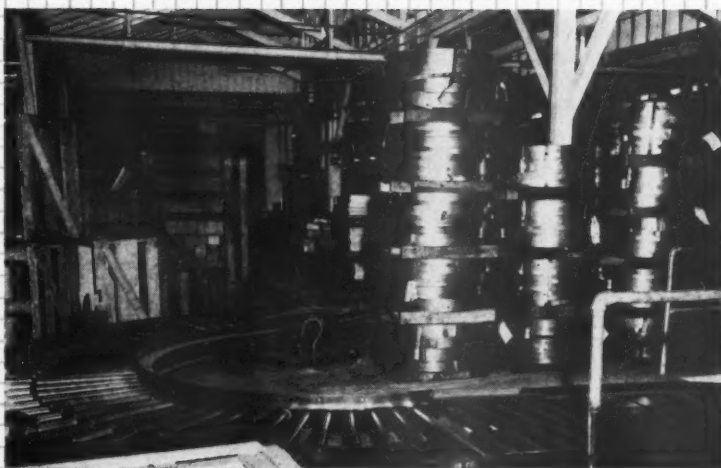
Changed Concept of Warehousing

The volume and service requirements established for the Richmond Package Division necessitated the adoption of a warehousing concept quite different from the conventional type. Some of the contrasting factors are shown in the accompanying table:

Not only clerical routines, but ware-

Continued on page 70

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-paying off in increased production ...

● Keeping material moving through plant processes is a job for conveyers and conveyer systems. When workers must leave their machines for trips to their source of material, time and production are lost. Modern conveyer systems bring materials to machines, into them and out again, with a minimum of handling by operators. They devote their entire energy to running their machines in their best and most efficient manner.

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YOUR M-H PROBLEMS

... begins on page 62

house layout and methods as well, were developed and adopted to capitalize on the six inherent characteristics of the Richmond Package Warehouse described at right.

Warehouse Layout and Methods

Essentially three principal steps were taken which substantially reduced warehouse labor costs, and order picking and assembly times. These were:

Conventional Warehouse

1. Emphasis on storage. Limited stock accessibility required.
2. Relatively large inventories. Low rate of inventory turnover.
3. Infrequent manufacturing for stock.
4. Emphasis on filling order from inventory.
5. Modest quantity of orders for limited number of products.
6. Moderate degree of mechanization. Higher degree of mechanization not warranted by rate of inventory turnover.

Richmond Package Warehouse

1. Emphasis on service. Rapid accessibility to stock needed to service orders.
2. Minimum inventory consistent with service demands. High rate of inventory turnover.
3. Frequent stock replenishment in quantities related to rate of movement and economical manufacturing batch size. (This was possible because of frequent manufacturing for direct shipment.)
4. Emphasis on manufacturing and filling for direct shipment. Minimize order-filling from stock.
5. Numerous orders for wide range of items.
6. Flexible, mobile, highly mechanized handling facilities for frequent and rapid stock turnover.

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STEEL RIGID-FRAME

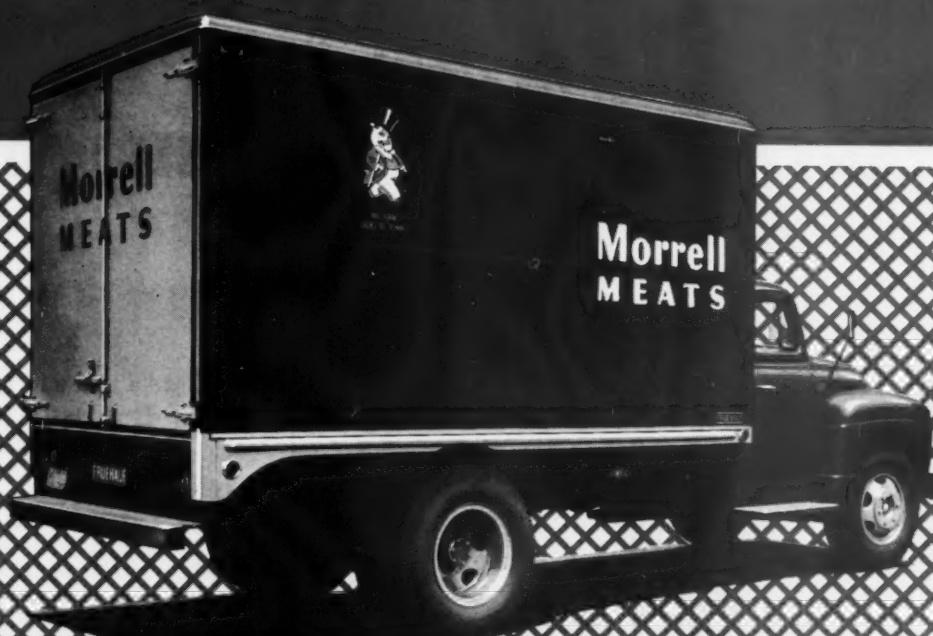
1. Arrangement of warehouse stock into forward and reserve stock areas. As seen in Figure 2, reserve stock consists of full pallet units tiered three and four high from which only full pallet quantities are picked using fork trucks. Less-than-full pallet order quantities are manually picked from the forward stock area.

2. Use of pallet racks for forward stock. Even with rapid inventory turnover, air rights were utilized. Forward stock was stored in three-tiered pallet racks as shown in Figure 3. Rapidly moving items were placed at floor level—easily accessible to the order picker; the second tier was used for slower moving items; and the top tier for reserve stock of items stored on the first or second tier.

3. Inauguration of order-picking tractors and trains. Each order picker operating in the forward stock area was equipped with a hand-tractor to pull a two- or three-car train. One tour through this area allows the order picker to pick several orders at a time, assembling the items on the cars by order and destination. These are then hauled either to the rail loading platform or truck docks where the items are checked and shipped. (Figure 4.)

FIGURE 4—This 3-car picking train has finished one tour of the forward stock area. These items are now on the way to the shipping dock.





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Revised

MILITARY PACKAGING & PRESERVATION

Specs

By

F. C. MARTIN and J. E. GRAY

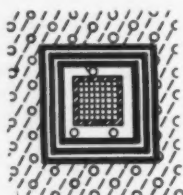
Preservation Specialists
Naval Supply Center, Oakland

METHODS OF PROTECTION



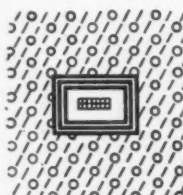
METHOD I

Part preserved. Wrapper not sealed. Water as liquid or vapor and corrosive atmospheres having relatively free contact with the preserved part.



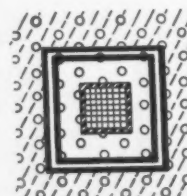
METHOD IA

Part preserved. Water-vapor proof barrier, sealed. Only traces of water-vapor penetration to preserved part possible.



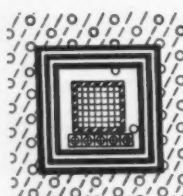
METHOD IB

Part, preserved or unpreserved. Wrapped or unwrapped, enclosed within coating of stripable compound. No penetration of liquid or water-vapor to part.



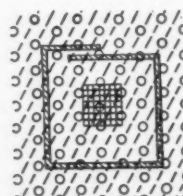
METHOD IC

Part preserved. Waterproof or water-resistant barrier, sealed. Only water-vapor penetration to preserved part.



METHOD II

Part preserved, where possible. Waterproof water-vaporproof barrier, sealed. Only traces of water-vapor penetration to part and this is adsorbed by desiccant.



METHOD III

No additional preservative on part. Packaged for physical and mechanical protection only. Relatively free access of liquid or water-vapor to part.

KEY

	Part or assembly		Waterproof barrier, sealed
	Preservative		Waterproof, water-vapor-proof barrier, sealed
	Desiccant, adsorbing moisture		Water vapor
	Unsealed wrapper		Rain, salt spray, etc.
	Mechanical or physical protection		Stripable compound

MILITARY PRESERVATION and packaging specifications, long a headache to large and small suppliers alike, have been revised to the point where the contractor can throw away his aspirin bottle. The new specs—MIL-P-116A—not only reduce the restrictions placed upon the supplier, but lessen his burden of reading as well.

There has been, however, no reduction—repeat, no reduction—in standards that must be met to satisfy military inspectors.

Mainly, the new specification goes farther to prescribe what, and not so much how. Where the old JAN-P-116 set forth in detail the processes for cleaning, preservation and packaging, the new spec simply prescribes standards and acceptable processes. The contractor retains the option to use any process that will meet acceptance standards.

In cleaning, for example, the standard to be met is a surface at a pH of 5 to 8 when tested while still wet from the final rinse. Seventeen cleaning processes, including the now acceptable steam cleaning, sandblast, vaporblast and soft-gritblast, are listed as appropriate. The supplier may choose any process or combination of processes that will satisfy the pH limits.

Pretty much the same option is allowed in selection of preservatives and preservation processes. Except where a specific preservative or process is named in the contract, the supplier may make his own choice. The proviso is added, however, that the contractor is responsible for selecting a preservative whose application and removal will not damage the mechanism or structure of the item.

The new specification has also changed the packaging method symbols to separate the water-resistant methods from the water-vaporproof

Continued on page 74

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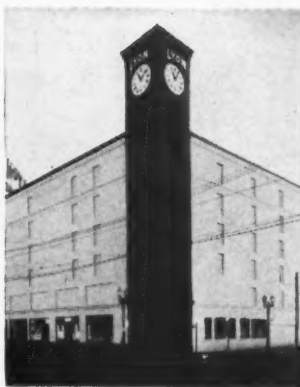
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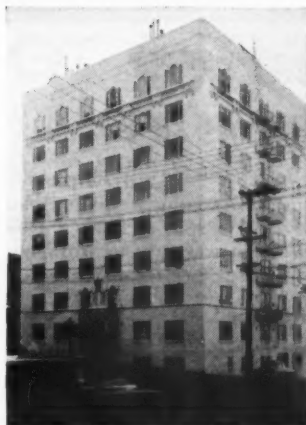
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airline administration, San Francisco



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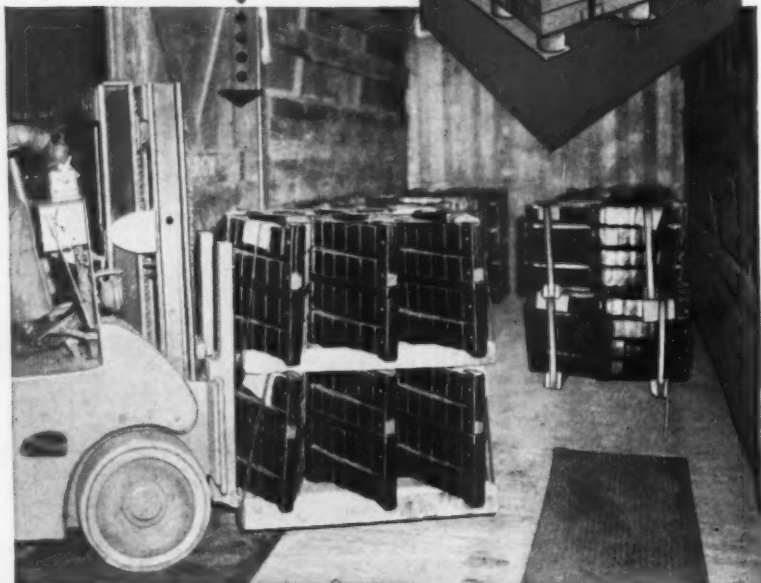
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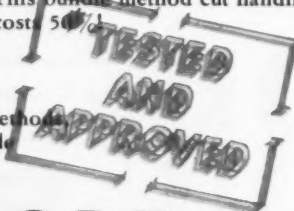
this one was a toughie!

Diesel springs, heavy and unwieldy, formerly were shipped loose in railway cars. At the point of assembly, each of eight component parts of the spring had to be handled separately. Signode, with the foundry men, worked out a new idea. Three pre-bundled

spring assemblies were strapped onto an inexpensive pallet. When the springs reached the assembly line, the steel strapping was left on the individual spring bundles until they were mounted in place. This bundle method cut handling costs 50%!

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MILITARY PACKAGING

... begins on page 72

methods. The latter are still designated Method IA, while the former have been redesignated Method IC. The change allows standardization of testing procedures for material processed by similar methods.

The new specification also goes farther than the old in setting forth

New Table of METHOD DESIGNATIONS

OLD SYMBOL	NEW SYMBOL
Method IA-1	(*)
Method IA-2	(*)
Method IA-3	Method IC-1
Method IA-4	Method IC-2
Method IA-5	(*)
Method IA-6	(*)
Method IA-7	(*)
Method IA-8	(*)
Method IA-9	Method IC-3
Method IA-10	Method IC-4
Method IA-11	Method IC-5
Method IA-12	(*)
Method O	Method III

*(no change)

sampling and testing procedures. This will be hailed by many suppliers as probably the most significant change, since it describes in detail what is expected of the finished package. The new procedure prescribes tests and samplings for all types of packaging and preservation. The old JAN specification set down tests for Method IA packages only.

The MIL-P-116A is standard for the entire military establishment. It became effective last March, superseding the JAN-P-116. Detailed information on the new requirements is included in the Manual of Preservation, Packaging and Packing of Military Supplies and Equipment, available from the Superintendent of Documents, Washington 25, D. C., at \$1.75 a copy.

Awards move West

FOR THE FIRST TIME in the history of the annual Putnam Award for the nation's most effective industrial advertising, one of the two top honors has gone west of the Mississippi River. Western Precipitation Corporation and its advertising agency, Dozier, Eastman and Company, both of Los Angeles, won the honor. The advertising campaign was prepared by S. C. Eastman of the agency and R. Calvert Haws, advertising director of the company.



ANYONE who can point this "gun" can make a GOOD SPOT WELD

"HELIARC" HW-8 Pistol-Grip Torch

**needs no forging pressure...works from one side of
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Are you using light gage metals to fabricate large assemblies or irregular shapes? If so, chances are you can simplify many of your joining problems, boost production, and cut costs, too, by spot welding with the HELIARC HW-8 Torch.



The HW-8 joins mild steel, low alloy, or stainless steel .020 to .064 in. thick at one to two seconds per weld. Because it works *from one side of the sheet*, without forging pressure, it makes an easy, one-hand job of

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Connected to a suitable power source with auxiliary timer, the HELIARC Spot Welding Torch makes inert gas shielded welds without fumes, smoke, or spatter. Since operation is automatically controlled, workmen on the assembly line need only press the "muzzle" of the "gun" against the work and pull the trigger. A single hose assembly permits free use of the torch over a 25-ft. radius.

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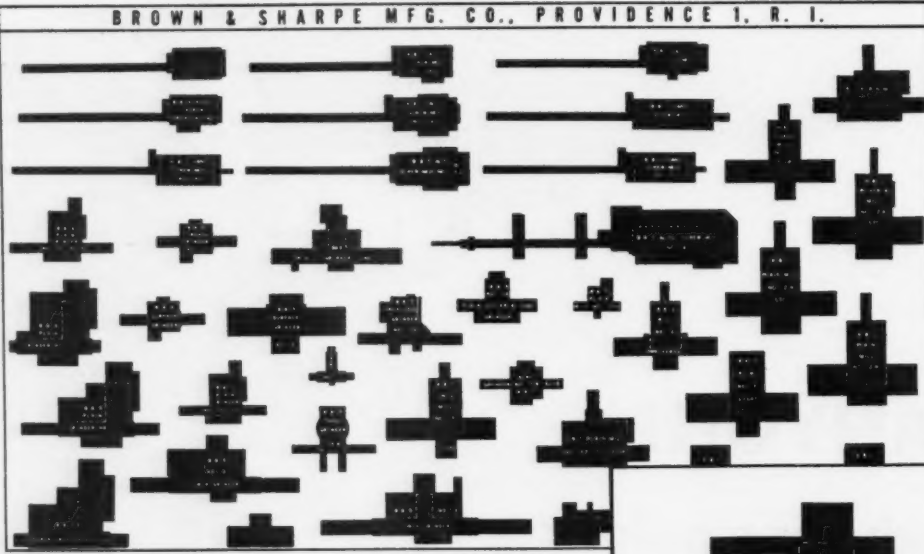
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Belt conveyor is a production pipeline running 140 ft. through heart of plant. Photo shows how assemblies feed into bins on either side.

Higher production volume in half the usual space with this

STRAIGHT-LINE CONVEYOR

BY CHANGING over from the traditional assembly flow in manufacturing exhaust systems to a continuous belt conveyor system, factory space requirements at Ryan Aeronautical Company, San Diego, have been cut in half and output increased.

Getting In Line

Exhaust systems manufacturing always has been considered to be more like the garment making industry than any other, because both produce innumerable models and sizes of the product with the same equipment. Consequently, Ryan production machines used to be arranged along logical parts "flow" lines and the various components threaded through them in the fabrication process. Machines were

placed so that trucks can bring the parts to them and the pathways of the different parts were likely to be widely divergent because of the varying requirements of each model.

When orders from Continental Motors for exhaust manifolds for the Continental Model 1790 engines which power the M-46 and M-47 General Patton tanks, plus orders from other large customers, resulted in a maze of new machines and assembly lines eating up factory floor space, an answer had to be found.

A straight-line assembly system was decided upon, but a new approach had to be visualized. The machines, tools and jigs had to be carefully positioned along the line. Exact number and spacing of these elements had to be coordinated with the conveyor line speed.

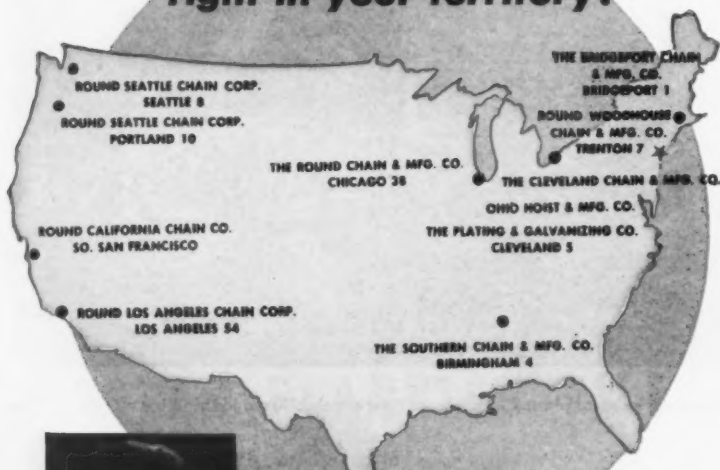
Careful timing of each operation was demanded. The 1790 exhaust manifold consists of five separate and differing components: an outlet section, two mid-sections and two end-sections. Each requires different operations performed upon it but all must flow down the same production line at uniform speed.

Must Keep Going

Eighteen separate tasks, such as assembly, welding, sandblasting, sizing, facing and inspection, must be performed along the line and no backtracking of the parts is allowed. Smooth dove-tailing of these operations had to be planned to insure that the prescribed proportions of each manifold would arrive at the end of the conveyor line. Engineering and



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Round CHAIN COMPANIES

THE OLDEST NAME IN CHAIN

tooling changes were worked out to permit the parts to be made under these conditions.

As soon as the new assembly line rolled into action it became apparent that it was the answer. Production of 1790 Continental manifolds has been substantially increased and the space occupied by the entire line is only half of that which would have been required by the former method of fabrication. In addition, the new belt line system has raised efficiency by reducing employee fatigue, preventing parts damage, simplifying training and providing better control of parts.

Make It Easy

Key function of the motorized belt is to bring the parts within easy reach of every employee in a uniform flow. This relieves him from having to move



Nearing end of production line, these sections were made in straight-line sequence.

about to get and dispatch parts, load conveyor trucks and wait for others to bring components to him. This saves his time and energy. It also permits the telescoping of all machines into minimum space because room for truck delivery is no longer required.

Parts are maintained in top condition as they are fabricated because they are transported upon a rubber-impregnated belt. Time required to orient experienced employees to the assembly pattern is stepped up from two hours to only 30 minutes because the complete sequence of operations is laid out along a straight line which can be quickly understood by a newcomer. Certain employees are trained for all

tasks so that they can be substituted in place of those who may miss work because of illness.

Control of the parts and fabrication rates is simplified because the foreman can see at a glance where all components are and determine causes for shortages or delays without looking in several areas.

Makes It Simple

The effect of the new production line at Ryan has been beneficial to the work of production control. It has substantially simplified paper work because the parts are now fed to a single location, the beginning of the line, instead of to many individual spots where various machines were located.

Previously, dispatch cards, or travelers, had to be prepared and inscribed at each assembly location as they accompanied the parts. Now, no travelers are necessary. The parts are simply fed to the beginning of the line and pass through without paper work accompanying them.

Makes Control Accurate

Cost control on the parts is simplified, too, because it is now possible to feed an exact day's work into the beginning of the line and to check the output of the line against a definite input. Heretofore, with the sprawling "batch" type of operation, this was not possible because the parts were quickly "lost" in the production arrangement.

No appreciable change has had to be made in the inventory backlog because it is easier now to plan production and to plan the requirements of all supplies and sub-assemblies for the line. Consequently, the need for increasing or decreasing these supplies, or inventories, is more apparent than previously.

Storage of inventory stocks is improved because now all these items can be stored in one location instead of having to be kept in a number of locations handy to the various assembly operations which were fed with parts.

Keeps Good Balance

Better parts control is effected due to another factor: the ready evidence of defective work, which shows up immediately in the line and indicates an out-of-balance condition. Previously, this loss of a part would not have been evident until a later date, causing the out-of-balance condition to become a more difficult factor to correct.

The conveyor system was built and installed by the Standard Engineering Company of Los Angeles. The belt is a continuous loop, 280 feet long and 22 inches wide, made of rubber-impregnated canvas. It is suspended over steel

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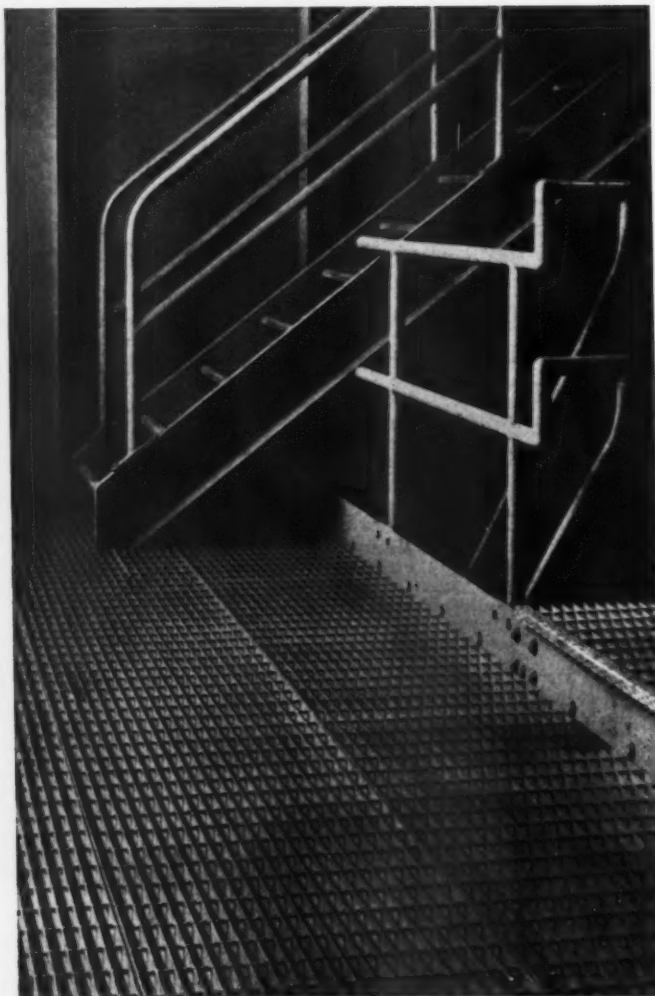
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rollers along the 140-foot assembly line and wound around steel, rubber-coated drums at each extremity. Power is supplied by an electric vari-drive motor which can be adjusted to provide belt speeds running from a few inches to several feet per minute. A magnetic push-button starter actuates the system.

Ryan specified the addition of a steel shelf which is located on each side of the belt so that parts can be removed from the conveyor without creating a storage problem at any station. The width of the belt and shelves is designed to give complete access to parts from both sides of the belt line.

These design specifications and the good flexibility of the conveyor drive give the system wide usefulness and adaptability to other types of fabrication. The new system was the joint product of Robert Clark, assistant production manager; Ray Ortiz, manifold production superintendent, and Floyd Bennett, manifold final assembly foreman.

Packaging costs cut 87% by strapping

AN INGLEWOOD, Calif., manufacturer of built-in ironing boards reduced its packaging costs 87% by the use of an improved light-weight corrugated container and the installation of a fast steelstrapping set-up.

L. H. Eubank & Son used to ship its wall-type ironing board units singly in heavy, one-piece corrugated cartons that cost 40 cents each. Now, however, they are shipped, two at a time, in steelstrapped packages made of four pieces of lightweight, low-cost corrugated board. Since straps, seals and corrugated board making up these packages cost only 10 cents, a 35-cent saving is effected on each unit shipped.

Packaging is now accomplished at strapping stations, each equipped with a small wooden assembly bench, two overhead-mounted Acme steelstrap coils and a semi-automatic Acme steelstrapper. Continuous lengths of 1/2-in. steelstrap are looped around the overhanging ends of the bundles and then quickly tightened, sealed, and cut with a single stroke of each of two handles of the strapper.

Bundles are then tied in the warehouse on wooden skid-type platforms and later transported by saddle truck to box cars for shipment. Since new packaging methods result in lowered tare-weight charges, substantial shipping savings are being realized. In addition, considerably less warehouse space is now needed for storing packaging materials.



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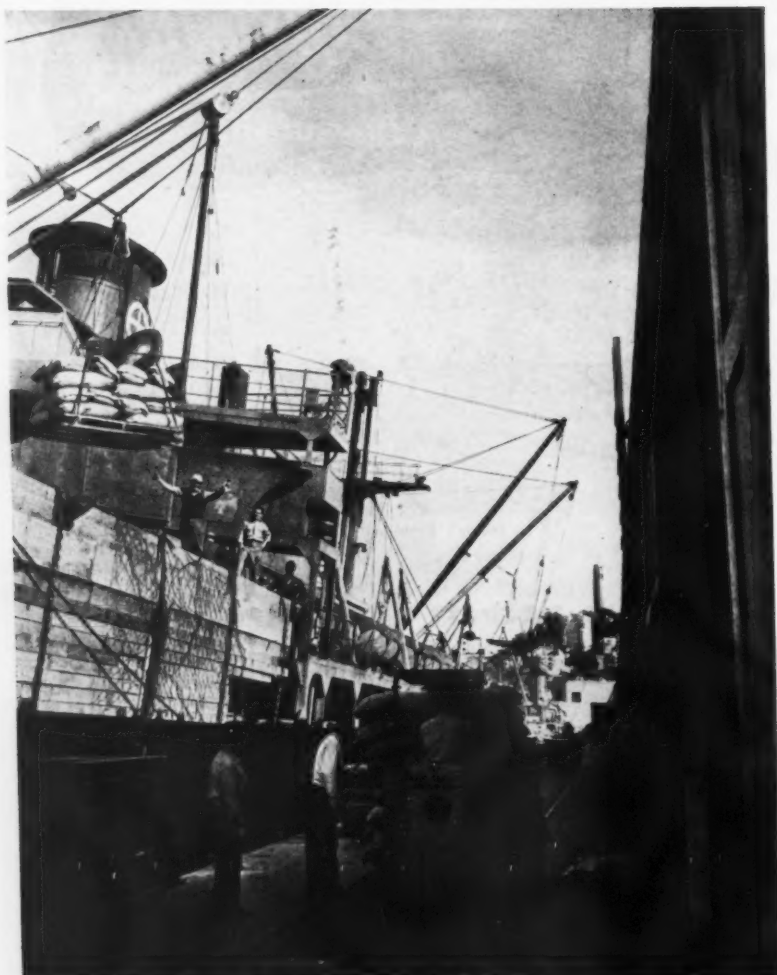
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Cost formula may be key to COAST PORTS PUZZLE

Basic elements may be revealed by a careful analysis, leading to a progressive solution

By
**FRANK E.
FELIZ**

Executive Secretary
San Francisco Bay
Ports Commission



PUBLIC PORTS and private terminal operators, as well as shippers, carriers, and traders in domestic and foreign commerce, look to the time and cost factors of cargo-handling and flow as the answer to the \$64 question: "Do we get the shipment? Or does it go to another port or through another coastal range where cargo handling time and costs are lower, hence more competitive?"

This problem has become the No. 1 headache of the American maritime industry, not only in terms of competition with other types of carriers, but in terms of a struggle for survival.

Studies by Committee

A study of the San Francisco Bay Area Ports made by the California State Senate Fact-finding Committee in 1950-51, pointed to it as one of the major problems facing the long-range program of commercial growth for the ports and terminals of the Bay Area.

In the mid-1920's there were more than 180 coastwise ships moving cargoes to and from the major West Coast ocean trading centers. Today, there are less than a dozen in regular operation, due largely to the competition of land carriers via rail and highway.

This competition is considered by some as a technological change that may not be overcome by the ocean water carriers, since they are required to handle a cargo item at least four times in the flow from shipper to point of destination. On the other hand the freight car or truck normally requires only a double handling cost in movement from siding to siding or door to door.

Intercoastal Also Declines

Intercoastal shipping has also shown a heavy decline of up to 50 per cent over the past decade, due in part to the competition of land carriers and to the transfer of East and Midwest industries to the West Coast. The prime reason for the decline, however, is still considered to be cargo-handling costs. Tonnage decline for Bay Area ports has been from an annual average of 7,690,000 tons of dry cargo, in the period from 1925 to 1940, to 3,029,000 tons in 1951, although 1951 did show a gain of one-third over the 2,227,000 tons handled in 1950.

It is an unwritten law of ocean shipping that the vessel only makes money while at sea, and merchant vessels formerly spent from 55 to 65 per cent of their life at sea, earning their prin-

Fork-lifting California bagged barley at San Francisco for shipment to South Africa. Deck load is packaged lumber.

cial revenue en route between ports of call and delivery. Today, that situation has practically reversed, with about 55 to 65 per cent of total voyage time being spent in port.

In port, cargo is moved a few hundred feet in order that it may be transported from 2,000 to 7,000 miles at



Heavy-duty derrick barge facilities

sea. Therefore, for each foot cargo is moved in port, it is transported 10 to 35 miles at sea, and handling the cargo in port is more than one-half the total operating cost of the entire voyage.

Substantial progress has been made in the handling of bulk cargoes, ranging from costly ore-loading installations to mechanized equipment for grains, copra, sugar and other commodities.

Petroleum products, with the exception of packaged goods, are also bulk handled by efficient, low-cost mechanized methods, largely due to the progressive studies and installation of bunkers and other marine facilities by the major oil companies of the Bay Area.

Bulk Handling Provisions

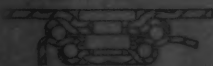
The Port of San Francisco's 500,000 bushel capacity grain-terminal; the C. & H. California-Hawaiian bulk sugar unloading facility at Crockett, the portable copra unloaders at Port of Oakland, bulk-loading facilities at Howard Terminal and Redwood City, and the rice and grain loading units at Stockton are typical examples of improved bulk handling facilities.

General cargo handling, however, is the target area for intensive study and action insofar as time and cost are concerned, because it is the time in both labor costs and ship turnaround that chalks up additional expense to be passed on to the shipper. While a number of the leading water, rail and truck

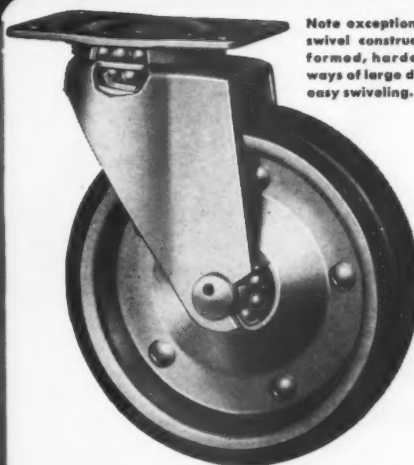
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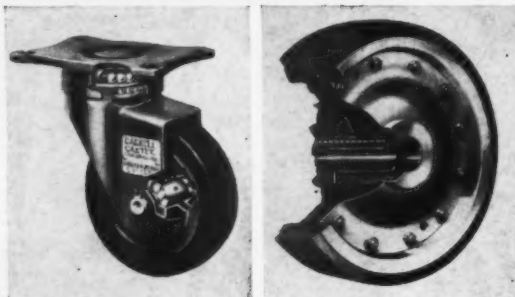
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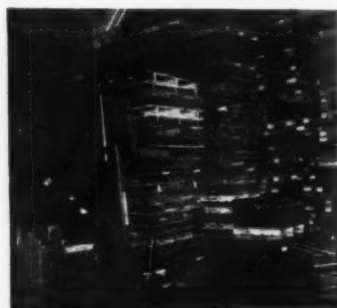
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carriers have conducted limited studies of the problem there is still much room for improvement, according to experts in the field.

It is difficult to estimate the proportion of cargo-handling costs in relation to gross revenue, as they differ with the number and type of items included, the facilities and equipment involved, and other varying factors. Gross revenue figures for 1949 for Pacific Coast shipping firms, however, indicate that 30 per cent of the total revenue earned by commercial steamship lines operating on the West Coast were paid for "stevedoring and other cargo expense." The ratio was the same for the Bay Area ports, where they totaled \$143,009,465 as against \$475,114,500 freight revenue.



Pallet-retrieving depots are a special feature of port service at Oakland and San Francisco. Pallets are code-marked to simplify returning them to owners.

A Federal study of labor-management relations in the West Coast maritime industry states that "the cost of handling cargo alone absorbs approximately 41 per cent of gross revenue." Paul Lawler, nationally known authority in the field, states "The costs incurred in loading and discharging cargo from common carrier vessels has been much greater than the costs of actually transporting the goods."

Cargo Handling Studies

Furthermore, since 1930 the costs of handling cargo have doubled if judged on the basis of hourly wages. But the tons moved per man-hour have decreased, and the spread between costs in 1930 and 1950 is therefore greater than wage increases indicate.

Steps are required to develop a series of cargo-handling studies which would afford more insight into correcting the problem. The primary aim would be to set up a pattern of operations for reducing costs that would improve the competitive position of the port and ocean shipping through the Golden Gate. The problem is also more difficult in terms of shipping ports and

Continued on page 151

20 ways

to cut handling and processing costs with **MASONITE HARDBOARDS***

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STOP WATCH and STANDARD DATA

Tie down the problem by comparing your labor costs, flow capacity and investment required

MATERIAL HANDLING costs can be "tied down" in such a way that management can look at them in the same manner that they look at production problems, comparing labor costs, flow capacity, and investment required before deciding on the method desired.

The stop watch can be utilized to develop standard data on material handling, and material handling equipment, in somewhat the same manner



By
ROBERT R. TWOMBLY
Industrial Engineer
Norris-Thermador
Corporation
Los Angeles

that it is used to determine production standards.

Any material movement contains part or all of the following basic elements (job subdivisions):

1. Pick up load
2. Transport loaded
3. Tier or stack
4. Release load
5. Transport empty

When the handling job is thought of in this manner it can be timed and standard data built up for each element. Forecasting costs for a proposed handling problem or thorough analysis of a present problem is possible with proper interpretation of this standard data.

All the elements, with the exception of the transport elements, would have single times for varying conditions. The transport elements would have to be placed on a time vs. distance graph and in this way would be flexible for all distances encountered.

Define the Elements

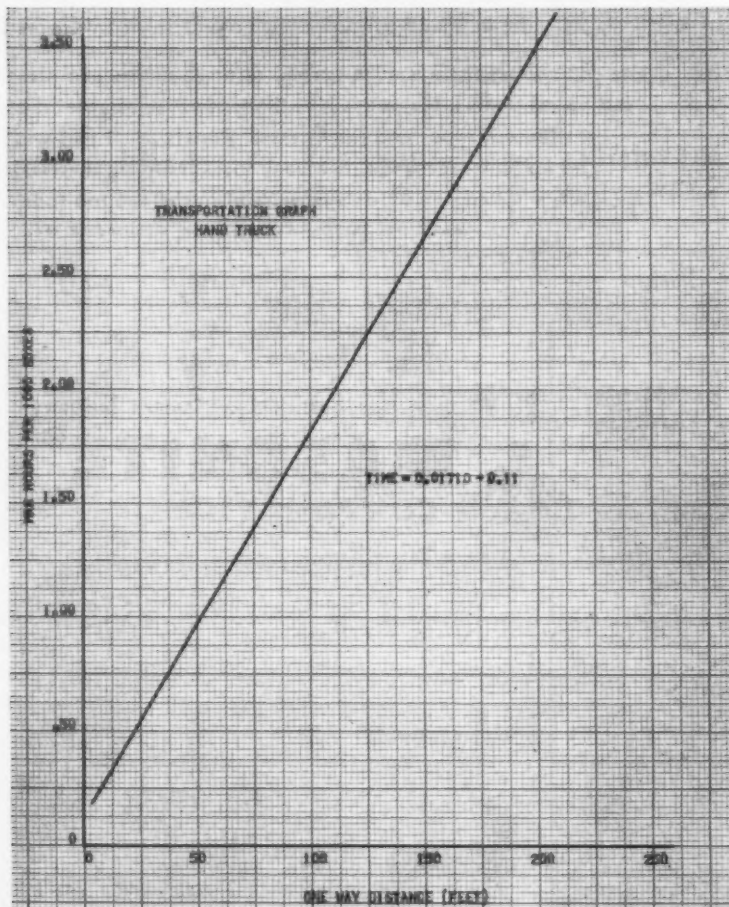
In order that everyone will have the same interpretation of the data, all the elements should be clearly defined. The pick-up should be defined as "the moment the transporting vehicle enters the area of the unit load, includes the grasp of the load, and ends when the load has cleared both the vertical and the horizontal planes of the original resting place of the load."

With this definition there can be more than one basic time due to varying conditions, and therefore care should be used in building the data and later using it to be sure that such factors as crowded conditions, open areas, etc., are accounted for.

The typical release is the reverse of pick up and can be defined as "the moment the load enters the area that is to be the temporary or permanent resting spot of the load, includes releasing the load, and ends when the transporting vehicle clears both the horizontal and vertical planes of the storage area." Conditions again will cause variances, even greater than pick up

Continued on page 89

For reference to graph in text, turn to page 89. Chart shows that the distance between zero and the point of inspection is the time consumed by undeterminables.



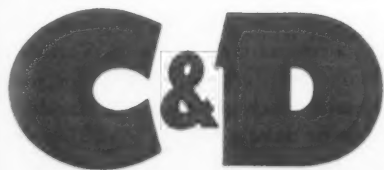


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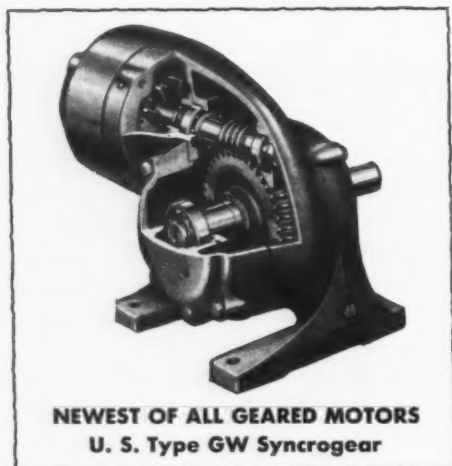


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USE STANDARD DATA

... begins on page 86

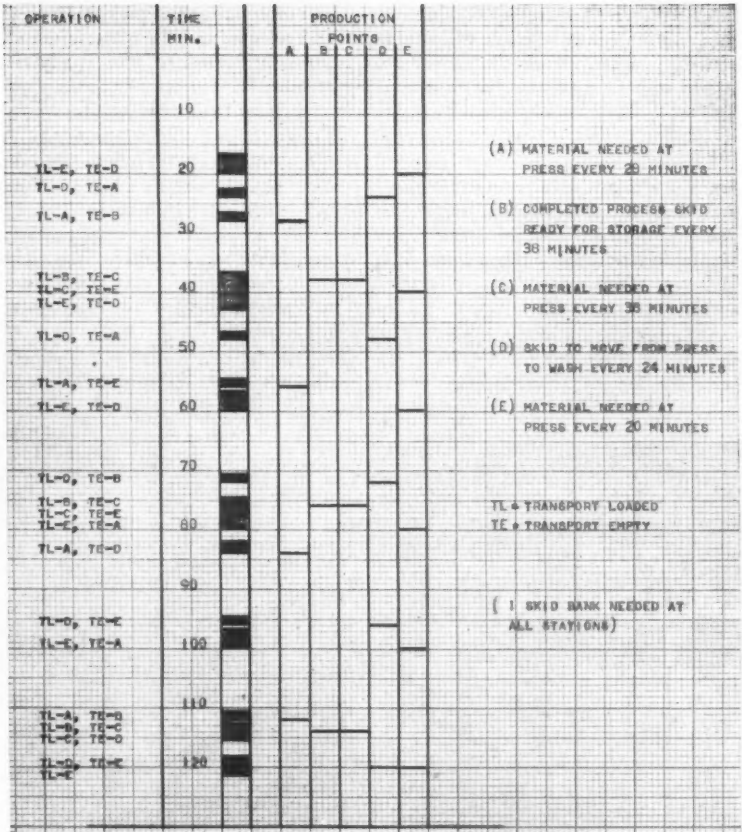
because of positioning, so care should be used in recording and using the elemental time.

Tier or stack does not occur in all material movements but it is very common in warehousing. It is the hardest of all the elements to determine and is sometimes easier to include within the release element.

An example of when it blends in with release is a fork lift truck positioning and raising the unit load at the same time. An additional effect of the tiering will also be noticed in this case due to releasing the load at a level other than that of normal vision.

Tiering times will be a separate time in cases such as hand stacking boxes in storage. Times will also have to be gathered for breaking the stack or if combined with another element (pick up) the additional time needed must be recorded and noted. Tiering, therefore, should be defined as "the additional time necessary to store, or remove the material from its place of rest over that required by a normal pick up or release load."

The transport loaded graph is built up of time values made from moving the unit load over varying distances.



SIMO CHART

This chart, discussed on page 156, is based on work flow and time required.

This element "begins when the load has cleared the place of rest and ends when the load first enters the release area."

The transport empty graph "begins when the vehicle has cleared the release area and ends when the vehicle first enters the subsequent pick up area." It is interesting to note that in the case of a belt type of material movement that the transport element is eliminated, at least when considering the man hours involved.

Transport Graph

In order to have a transport graph that is reliable, considerable care must be taken to see that accurate measurement of distance is made to coincide with the time value. When points fall to one side of the normal pattern there are two main possibilities to look for, either that the distance was not measured correctly, or that more than normal interference occurred. If it was the latter it should have been noted on the study.

The real value of using times that are taken under actual conditions rather than the equipment manufac-

Typical Pick Up Elements

Pick up loaded pallet from the bed of a carrier.....	.07 MH/1000
Pick up loaded pallet from a floor level surface.....	.06 MH/1000
Pick up loaded pallet in storage room. Ave. of 1st, 2nd and 3rd tier stacks.....	.09 MH/1000
Pick-up 6-high stack of boxes with hand truck when the boxes were originally placed in position by hand truck or stacked with adequate spacing between stacks for clamps to enter.....	.29 MH/1000
Pick up 6-high stack of boxes with a hand truck in an open area with sufficient room for easy maneuver.....	.23 MH/1000

Typical Release Elements

Release loaded pallet on floor level surface or receiving apron.....	.04 MH/1000
Release loaded pallet in storage room. Ave. of 1st, 2nd and 3rd tier releases. Electric Truck.....	.09 MH/1000
Gasoline Truck.....	.06 MH/1000
Release loaded pallet on roller conveyor that extends out the carrier door about 3 ft. Fork lift truck is on the same level as the carrier door.....	.08 MH/1000
Release load on dolly or on a roller conveyor that starts at shipping carrier door. Fork lift truck on ground level. Double release necessary to place pallet in position. Lift not in release.....	.22 MH/1000

Typical Tiering Elements

HIGH-PIILING	
Two men stacking boxes from 6 high to 10 high.....	4.06 MH/1000
Two men stacking boxes from 6 high to 12 high.....	4.53 MH/1000
DE-STACKING	
Two men de-stacking boxes from 10 high to 7 high (Top man stands on bench).....	3.65 MH/1000
Two men de-stacking boxes from 12 high to 6 high.....	4.03 MH/1000
Two men de-stacking boxes from 14 high to 6 high.....	4.91 MH/1000

turer's figures for transport times is that normal interference will automatically be included in the basic time. It will also tend to point up and emphasize places that have an unreasonable amount of interference.

The transportation graph will assume a straight line intersecting the time axis at a point about zero. The distance between zero and the point of intersection is the time consumed by such underterminables as acceleration and deceleration.

Different types of equipment will have to be analyzed in various manners. The fork lift truck can be studied

by combinations of pick up, transport, and release, and the material handling times for assigned jobs easily determined.

A belt handling problem can be more complex, due to its lack of flexibility. Although there will not be any man hours used in transport on the belt it will often be necessary to get the material to and from the belt. In this situation the analysis becomes one of combinations of material handling equipment plus the time necessary to stack on and off the belt.

Standard data that is developed for the material handling operations will

likely not be as exact as the data that is used in setting production standards, but if this fact is realized and admitted by those using the data, material handling will be better planned and therefore more efficient than it was by the previous guess or trial and error method.

Warehousing Problem

Each industry has its individual problems, but basically there are only two main categories of material handling: production flow and warehousing flow. Production's concern is to have the correct material at the right spot when it is needed. Warehousing's main problem is to use fully all the available space.

In either one the prime object is to handle the problem in the most efficient and economical way possible. Management can easily determine the original purchase price and estimate the probable maintenance cost. Now, by use of this basic data method, management can compare these costs with the labor savings and also forecast the percent of utilization on this equipment. These facts should be the basis for decision when the problem is to purchase a new type of equipment or to better utilize the equipment that is on hand.

As previously stated, the main problem in warehousing is to fully use the available space with the minimum of expense. Many different variations of the problem occur in the warehouse and each will have a different solution but may be handled with the same basic approach.

Utilizing Present Plant

The ideal situation in many types of warehousing is to build a new plant of modern design which combines the experience that men have accumulated over many years. This warehouse would be all on one level with high ceilings and adjoining space available for further expansion when it is warranted. This plant would probably use the fork lift truck on one of its adaptations, such as the industrial squeeze truck; but normally such a new building is not feasible.

Then the next object is how to best utilize the present plant. Such a condition was studied in the fruit industry by use of basic time data obtained with the stop watch. Five different type of handling equipment were contemplated for use; hand trucks, belt conveyors, floor chain conveyors, fork lift trucks, and the industrial squeeze truck (an adaptation of the fork lift truck).

An accompanying graph shows how

Continued on page 92

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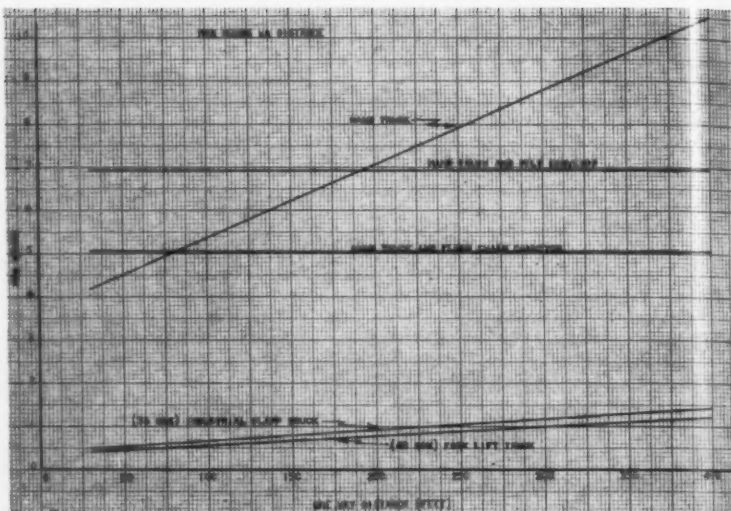
USE STANDARD DATA

... begins on page 86

this different equipment compared based on the man-hours used. Management could then look at this graph, determine the man-hours needed to move the material the average distances that occurred in their plant, and then compare these labor costs with the installation and maintenance costs for that type of equipment.

To build these graphs the problem must first be recognized and then analyzed.

The problem: Material must be received from a highway truck, moved into the warehouse, and the boxes stacked 12 high. (Each box weighs approximately 50 pounds and should be handled with reasonable care.)



From this graph comparing equipment, management can determine man-hours needed and the relative labor costs.

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- If a hand truck is used to unload material directly off of the carrier and transport into storage, then the following elements occur:

1. Pickup load on carrier. (Unit load six boxes)
2. Transport load to storage area
3. Release load to storage area
4. Hand stack the boxes in storage from 6 high to 12 high
5. Return to carrier for next unit load

Elements 1, 3, and 4 will have constant time values, but transport time, elements 2 and 5, will vary according to the distance traveled and will be in a straight line relationship of time to distance. This problem can now be placed on a time vs. distance graph with the line intersecting the time axis at a point that reflects not only the acceleration and deceleration of the transportation, but also the constants of pick-up, release, and tying time.

Actual Operating Conditions

Each of the other types of equipment can be plotted on the same graph and the relation of the man-hours consumed on each type of equipment can easily be seen. This comparison will not be the figures that would be obtained from the manufacturer's data, usually made under ideal conditions, but instead would be data taken under conditions that would exist in actual operation.

This type of study brought forth an improved method that would probably have been overlooked if not for a more analytical approach. It had been planned to unload the road truck to the receiving dock by means of a hand truck before being picked up by the industrial clamp truck.

Continued on page 154

YALE GAS TRUCKS

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In the
warehouse

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25 HINTS to cut cost of LIFT TRUCK OPERATIONS

By
**O. T.
HENKLE,
JR.**

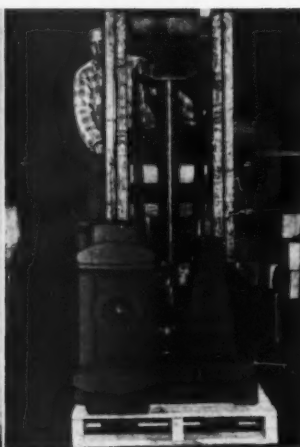
Member
The Material
Handling
Institute
Inc.

OPERATOR JUDGMENT is as important to a job as good truck design, material and workmanship. In some ways it is more important, because lack of proper judgment can result in considerable property damage, severe injuries or even loss of life. It must be remembered that tons of material, possessing an enormous amount of kinetic energy, are being handled whenever the fork truck is in operation. This force must always be carefully controlled if operating and maintenance costs are to be kept at a minimum.

The attainment of this objective can be aided by observing certain rules



DO outline travel-ways for in-plant trailer-trains. Use contrasting paint to emphasize overhead obstructions.



DO carry maximum loads at minimum height so as to reduce torque loading on fork truck. Maximum loads at high lift tend to reduce maneuverability and stability.



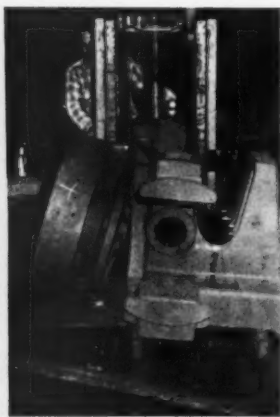
DO load your pallets properly. Make certain the load to be carried is in a stable position.

SOME DO'S and DON'TS

DON'T permit your travelways to deteriorate. To avoid injuries and spilled loads, drive truck around not over obstacles, such as man-hole pictured.



DON'T stack your loads on damaged or worn pallets. Material on pallet should not obscure operator's vision, be precariously balanced, or extend beyond pallet.



DON'T carry a load so that it prevents the operator from seeing. If necessary, travel backward to give the operator unobstructed vision.



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rules

which, when tailored to your individual requirements, will guide the electric fork truck operator to more economical and safer material handling operations. These general rules may be classified as: (a) Proper Use of Equipment; (b) Proper Loading of Equipment; (c) Proper Movement of Loads, and (d) General Safety Precautions.

Proper Use

The primary rule in proper use of equipment is to permit only qualified operators to drive the fork truck. Whenever the truck is left idle, the key should be removed from the cut-out switch. This will render the truck inoperative and prevent unauthorized use.

Reverse gear should not be used as a substitute for brakes, because this action imposes severe strains upon the drive assembly. If the brakes are faulty, this condition should be reported to the maintenance department and the necessary repairs effected immediately.

Proper Loading

It should be the truck operator's responsibility that each unit-load be securely piled before attempting to move the load. When this is ascertained, then the operator should drive the truck under the pallet as far as possible to avoid spilling the load. At the same time, the truck forks should be located centrally under the pallet, because off-center loads reduce the stability of the truck and also exert unnecessary strain on parts of the lifting mechanism.

Equal in importance to the location of the load, is the amount of the load. The operator should be aware of the maximum safe-loading capacity of his unit and take care not to exceed this established safe limit. When carrying loads at or near this maximum limit, or when loads are being transported at high-lift on telescopic trucks, extreme care should be taken in maneuvering the fork truck. Only first or second speed should be used and the floor should be smooth and level.

When loading into highway trucks or trailers, be sure that the receiving unit brakes are set and wheels are blocked. If the springs are weak, the body should be supported with jacks or braces. Also, inspect all car, truck and trailer floors carefully before entering with a lift fork truck. The operator should be certain that the floors are strong enough to support the combined weight of the fork truck and the load.

When starting to move the fork

Continued on page 97

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LIFT TRUCK COSTS

... begins on page 94

truck with a load, all speeds should be used. The controller handle should not be thrown into top speed immediately. When stopping, however, the controller should be quickly returned to neutral to avoid dangerous arcing. The truck should not be driven in an unsafe condition. Any mechanical or electrical deficiency should be reported to the property authority immediately.

Care must be taken to prevent the loaded truck from passing over chips, oil, materials in process or other obstructions. Dirty floors should be reported to those responsible. Aisles should be marked with contrasting stripes and kept clear at all times.

Care should be taken to prevent bumping into objects. This is especially so when backing or turning the loaded truck. During travel, any tracks encountered should be crossed on a diagonal and the operator should keep a firm grip on the steering control. At the same time, when approaching elevators, travelling near pits or down inclines, the track speed should always be reduced.

When approaching or passing noisy machines, extra operator care is called for to avoid distraction. The horn or warning signal with which the unit is equipped should be used only when required but the operator should be certain that his warning was sensed.

The operator should travel with the load as close to the ground as possible to insure stability over rough roads and also while making turns. When carrying loads at high-lift on telescopic fork truck models, it is necessary to watch the overhead obstructions and be certain that sufficient clearance is available.

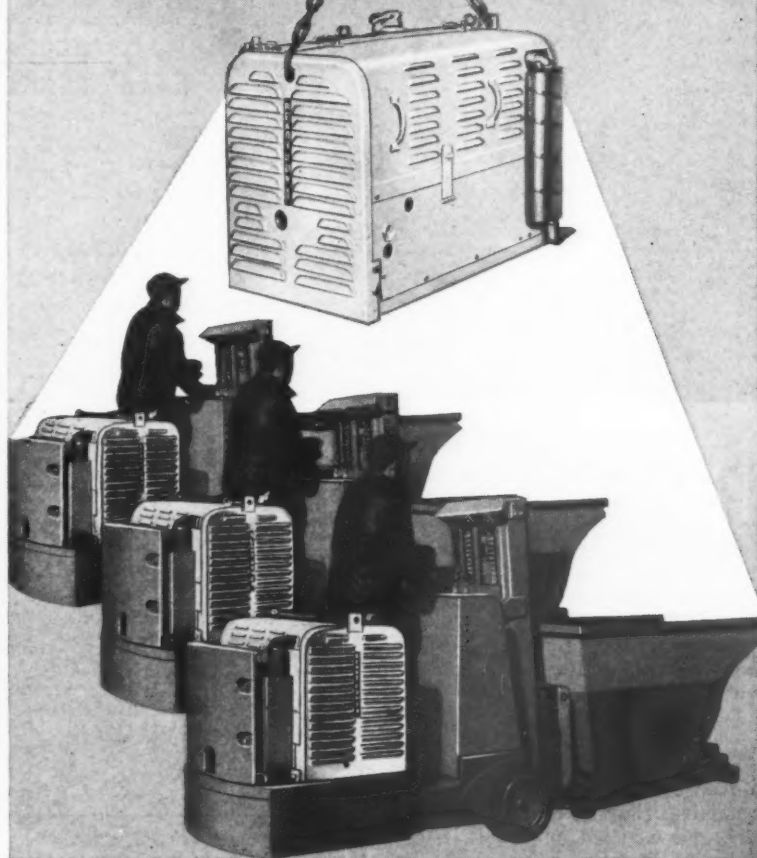
General Safety Precautions

Operator safety is most often dictated by common sense. Some of the more common violations are cited here to accentuate the seeming unimportance of conditions which may result in accidents. When the truck loading is such as to obstruct the operator's view, the truck should be operated in reverse.

The operator should never attempt to drive a truck with wet or greasy hands. Also, no riders should ever be permitted on a unit. The operator should take care to keep all parts of his body inside the confines of the truck and at the same time, should never attempt to maneuver too close to pedestrians.

Information for this article, courtesy of the Material Handling Institute, 1108 Clark Building, Pittsburgh, Pa.

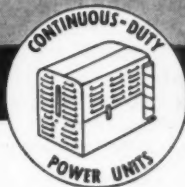
PREVENTIVE MAINTENANCE *eliminates truck downtime*



READY-POWER is **BEST** FOR PREVENTIVE MAINTENANCE

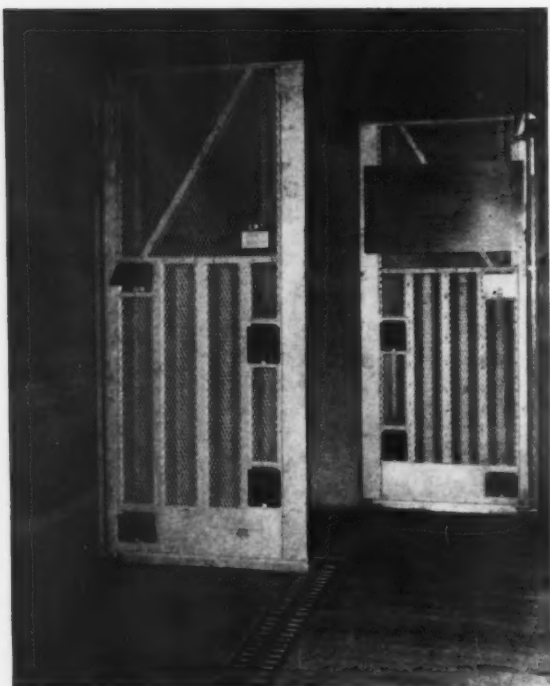
Tie up a truck because of power failure? Never! Equip your fleet with *interchangeable* Ready-Power gas-electric units and, then, have one extra for the shop. Thus, power units can be rotated for preventive maintenance ... and your trucks stay on the job ... where they belong.

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COMPARTMENTIZED BOX CARS cut bumping action

Gates in Western Pacific's compartmentizer cars can be adjusted to any position to fit any load and reduce movement inside the car

PACKAGING AS A SCIENCE has progressed remarkably in these past few years . . . particularly in instances of goods sold to ultimate consumers—goods such as cosmetics, electrical appliances, and automobiles. But it seems that the farther away we get from the ultimate consumer, the less attention is paid to packaging.

Old Faithful

For example, consider the age-old railroad box car. It too is a package, containing many other smaller packages, and mounted on wheels. It is subject to considerable bumping . . . up-and-down as well as end-to-end. As a result, manufacturers of goods shipped in box cars have had to send their goods in packages that would withstand such shock.

Gets a Face-Lifting

Until lately, very little had been done toward improving the box car's ability to deliver its contained packages without damage from this bumping action. Now, however, railroads themselves are becoming more conscious of this problem. They are starting to consider the need for improving their mobile package in ways other than just the interior (such as Western Pacific's compartmentized all-steel box cars now in use).

Improved riding qualities and dissipated vertical and longitudinal shocks that occur during road move-



By
**LEO F.
DELVENTHAL
JR.**

Transportation
Inspector
The Western Pacific
Railroad Company
San Francisco

ment are high on the list. Our first consideration is the car truck and its riding qualities.

Stabilizing spring suspension incorporated on the new Chrysler car trucks substantially reduces vertical oscillations, and preserves car contents much better than heretofore.

The most severe element of force that the mobile package is subjected to, is the end-to-end impacts when

Continued on page 100

HOW TO MINIMIZE "BUMPING" DAMAGE

OF THE \$100 MILLION paid annually by Class 1 railroads in the United States to shippers in settlement of loss and damage claims, approximately 70% are classified under "unlocated damage," "improper handling damage" and "concealed damage," according to Jack M. Roehm, associate director of development, Pullman-Standard Manufacturing Company.

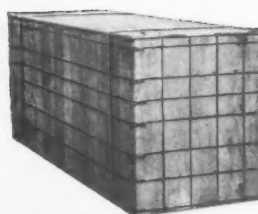
"In other words, a high percentage of the annual damage cost exists because of the inadequacy of the present means of packaging and anchoring loading to protect it from the vertical and horizontal forces to

which it is subjected in train service and yard operations.

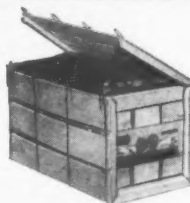
"The mean speed of impact in classification yards is seven miles an hour, well above the draft gear closure speed which affords protection to the car and its loading only in the 22% of the impacts which occur below this speed. Present draft gears are entirely inadequate for the amount of energy they are required to absorb. The rubber cushion sliding center sill is a step in the right direction toward solving this problem. Adequate horizontal cushioning appears to be the main problem facing the railroads today."



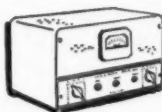
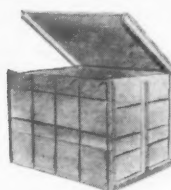
TRACTORS



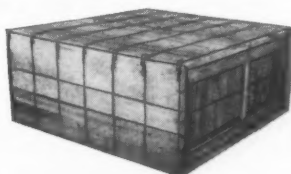
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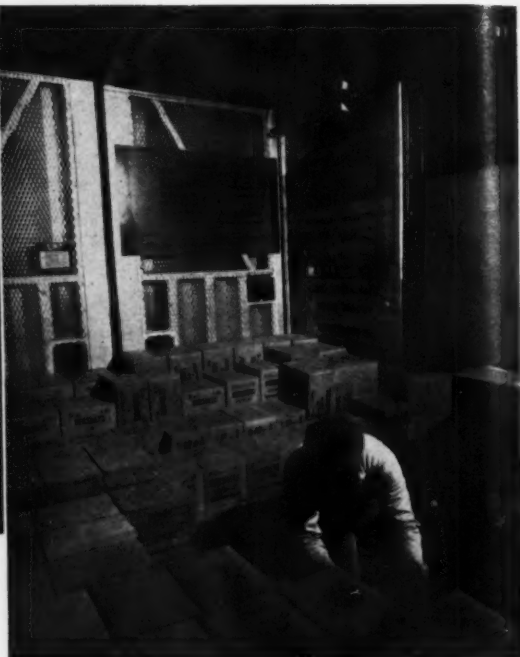
City _____ Zone _____ State _____

Our Product is _____ It Weighs _____



ADJUSTABLE GATES may be securely placed against partially loaded car for maximum bracing of load (above). After loading each end of car, remaining one-third of center may be loaded between gates completely bracing fully loaded car.

LOADING THE CENTER of a compartmented car (right) with one set of gates locked into position.



(Continued from page 98)

switching cars. In the future we hope to have in service test cars employing an improved cushion underframe. This is the type of package improvement that can be made to a box car which tends to eliminate the need for equipping all cars with special interior fixtures.

Loading Pattern Change

To some extent, blocking requirements have been eliminated as a result of recent drastic changes in carloading patterns. Carloading technique has likewise been affected by application of wire and strap to secure carloads. Primary cause of the changing pat-

terns in carloading techniques, however, stems from introduction of new and improved packaging.

Rigid Loads

Of the three types of loads (rigid, free-floating and controlled floating) the rigid is perhaps most predominant. Good examples of rigid loads are those consisting of goods packaged in fibreboard containers. Such containers or cartons must be braced rigidly to withstand the longitudinal bumping during switching, and movement over the rails. Such loads are highly susceptible to lengthwise compression.

In order to eliminate this compression factor, and not allow slack to

appear in the loading pattern, the load must be engineered to create unit stability. Stacking the load after the pattern of bricks in a wall does quite well in this regard.

Nonetheless, actual tests reveal that even a brick-pattern load will develop slack. Controlled tests indicate unmistakably that a full (by actual measure) box carload of fibreboard containers full of food products can be compressed from nine to 12 in. without damage to packages or contents.

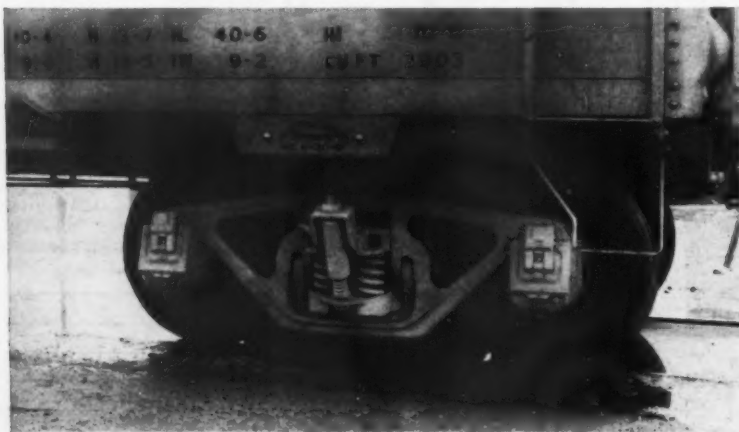
No "Shuffle" Space

Obviously then, something more than a stacking pattern is desirable. Bulkhead gates or dividers inside the car, situated so as to divide the car into three equal compartments, offer the needed protection. This innovation serves to limit the amount of slack developed within each of the three space units inside the car, to a point where a shifting cargo cannot render much damage, if any.

Improvement Continues

As a special service to the shippers, we are starting a program to assist the shippers in engineering their material handling equipment requirements. Research is now in progress to improve the features on a lift truck which will permit cases stored on pallets to be loaded directly into the car, mechanically discharging the pallet and restraining the load in a unit without dropping or causing any damage to the package.

CHRYSLER DESIGN trucks on new Western Pacific compartmentizer cars go a long way toward minimizing some "bumping" damage.

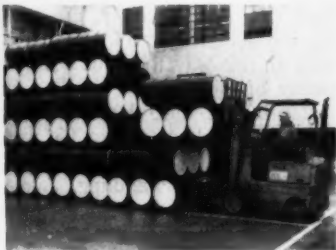


HANDLING EMPTIES

... twelve drums at a time with skeleton steel pallets means more storage, higher stacking

BY USE of skeleton steel pallets for empty drums instead of the conventional wooden pallets, E. I. du Pont de Nemours & Co. has been able to increase yard storage capacity considerably at its paint plant at South San Francisco.

Formerly four empty drums were stacked by hand upright on wooden pallets, and then moved by lift trucks.



Now, twelve drums are handled simultaneously on two skeleton steel pallets, six drums laid flat and parallel on the bottom layer, and six more crosswise for a second layer above. The system makes it possible to stack the drums six high by lift truck, and in last winter's strongest winds the stacks were undisturbed.

The pallets have three uniform cradles on each side, so the pallets can be used either side up. The cradles are two inches deep, thus safeguarding the drums against rolling.

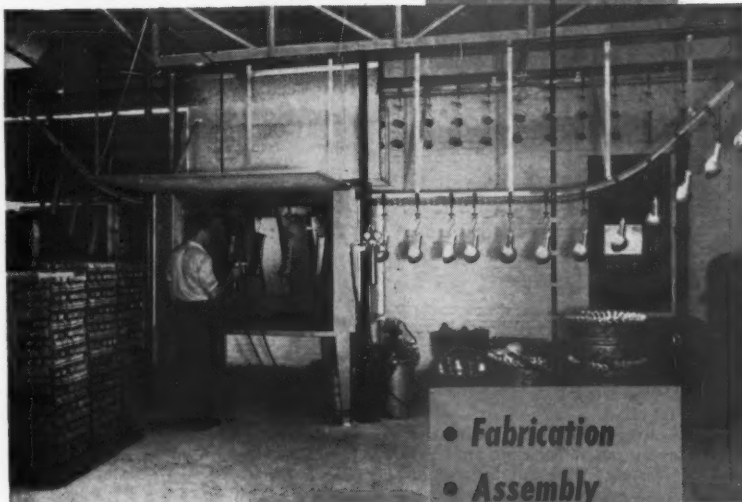
Lapham Engineering of Martinez, Calif., engineered the pallets.

NAM clearing house set up for sub-contracts

NATIONAL Association of Manufacturers has completed plans for a clearing house enabling small firms to learn where to go for contracts and assisting prime contractors to increase their lists of potential sub-contractors. The association's 12 regional offices will make the service available to all manufacturers throughout the country regardless of membership or nonmembership in NAM.

Manufacturers seeking sub-contracts will be asked to file facility forms supplying data on machines and other available facilities. They will then be told of prime contractors who might utilize their services. The forms for Western firms may be obtained through NAM's offices in Los Angeles, San Francisco and Portland.

Carries loads thru any process



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CONVEYOR

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- Baking

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"SUPER TRIPLE-S." Goodall's finest grade. Heavy duck carcass, high tensile rubber covers and strong friction between plies combine to make this the perfect belt for the longest, heaviest hauls. Designed to carry crushed limestone up to 10", aggregates, ores and other abrasive materials, wet or dry.

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Contact the nearest Goodall branch for complete information on the items described above, or any other industrial rubber products you may need—canner's, grain, elevator and transmission belting; steam, air, water, acid and fire hose; packings; gloves, clothing and footwear for plant or laboratory. The Goodall trademark is your guarantee of quality and reliability.



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"TRIPLE-S." Same superior quality as "Super Triple-S," but of somewhat lighter construction. Widely used for handling crushed limestone up to 8", run-o'-mine coal, ores, slag, wet char, etc.

"GOODALL." The *right* belt for the greater number of conveyor jobs where the extra qualities of "Super Triple-S" and "Triple-S" are not required. Unequalled for reliability and economy in conveying crushed stone, gravel, sized coal, shells, ashes, salt, etc.



LOGS AND PULPWOOD BUNDLED, STRAPPED

Cuts down number of pieces handled, reduces log loss plus rafting, towing and storage expenses

SOME OF THE LOG and pulpwood handling methods being employed in the Pacific Northwest were outlined by G. E. Liming of Rayonier, Inc., in a paper presented at the Northwest Wood Products Clinic in Spokane in April.

According to Liming, several Northwest firms, including Crown Zellerbach, Schafer Logging Co., Publishers Paper Co., and Rayonier, are strapping and bundling both logs and pulpwood. In this way they cut down the number of pieces to be handled and substantially reduce log loss, when small logs are dumped into the water at the mill.

With individual handling, amount of logs lost from sinkers, logs slipping out of rafts and miscellaneous causes, usually amounts to about 5% of total logs handled. However, out of the 27,000 logs Rayonier bundled in 1950, only 32 were lost or unaccounted for. The previous year the same number of logs were handled, with a log average of 317 board feet and a bundle average of 4,125 board feet.

Storage Space Halved

Besides reducing log loss, rafting, towing and storage expenses are much less for bundled logs. It takes only about one-half as many boom sticks and storage space for bundled logs as for single log rafts.

At Rayonier's Willapa Harbor, Grays Harbor, Sekiu and Port Angeles operations, acid resistant wire cable 9/16 in. wide and 30 ft. long is used for strapping. Special Meighan hooks serve as fasteners. Although galvanized cable was originally used, treated rust resistant cable, which is less expensive and easier to procure, was found to be just as satisfactory. Size of bundles in these operations is determined by available crane capacity.

At Willapa Harbor, pulpwood for temporary dry storage is brought to the reload station in 8-ft. lengths, usually in three- to five-cord truck loads. Load is divided into two parts by separators in the woods. A crane lifts off the half load, and while it is in the crane, a single strap is placed around the center of the load. Pulpwood remains in this bundle while in storage so that it can be easily placed on railroad cars from storage. After bundles are loaded on railroad cars, straps are removed.

At Port Angeles, pulpwood is brought to plant in uneven lengths from 8 to 50 ft. long. This is bundled into half-loads in the woods with straps on each end of the load. Some of it is put in the water and some in dry storage.

Small logs at Grays Harbor are bundled on trucks by placing a strap at each end about three ft. from end of shortest log. When load is lifted from truck, it is slid into the water on a gentle incline so that strap fasteners will remain on top and will be easy to unhook at the mill.

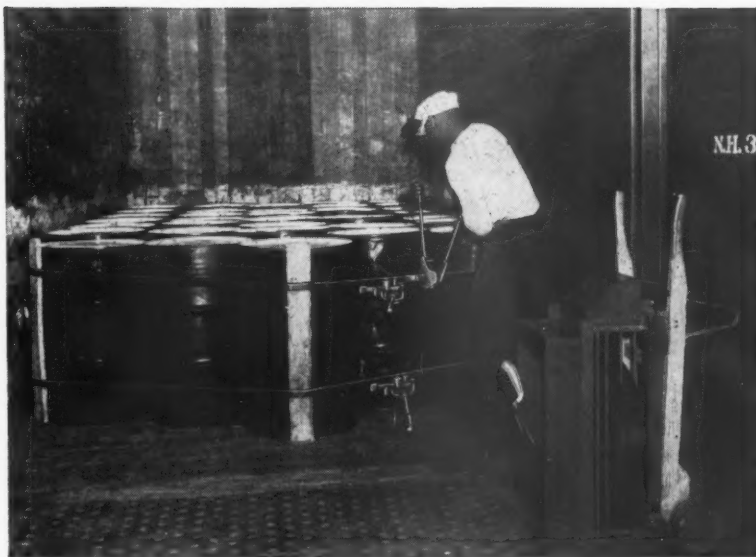
At Sekiu, logs are strapped on company railroad cars. After being dumped into water, they are loaded on crib rafts and towed to Port Angeles. When rafts are broken down at Port Angeles, many of the bundles are floating with fasteners under water. To solve this problem a cable pulling device has been installed at the mill which slips the cable around the bundle so that the fastener will be on top and easy to undo.

One of the main problems in bundling operations is scaling. Since it is not possible to scale bundles in the water, this must be done while they are still on the truck. In scaling uneven length pulpwood, some companies scale height and width of load and estimate an average length, while others attempt to scale cubic content of each log and apply a solid cubic content per cord.

Rayonier has found that straps need not be extremely tight. In fact, straps and equipment are damaged and considerable time is lost if straps are drawn too tightly around bundles. Also, bundles tend to roll in the storage piles when straps are unreasonably tight. With looser straps, logs nestle in the storage pile and are more stable. When bundles are dumped in the water, the buoyancy of the logs keeps the straps tight.

Railroad potential big

ONLY A START has been made in tapping the potentials of modern materials handling equipment in improving railroad service, according to William H. Schmidt, Jr., executive editor of *Railway Age*, at a joint meeting of the Caster and Floor Truck Manufacturers Association, the Conveyor Equipment Manufacturers Association and the Industrial Truck Association, held under sponsorship of The Material Handling Institute. Chief opportunities lie in the freighthouse for handling LCL freight, in the materials yard for moving and storing the railroads' own purchases, and in stations for moving mail and express.



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PLAN IN 3 DIMENSIONS—

The new trend in plant layout and design

THE CONVENTIONAL procedure of plant layout planning complete with drafting board, blood, sweat, tears, and a great percentage of error, is being replaced with the so-far-unbeatable method of using three-

dimensional scale models. Pictures shown may look like your youngster's toy village, but it is, in actuality, an accurate reproduction, complete in every detail, of a floor area with exact miniature models of equipment used.

BE PREPARED { To increase production To lower costs

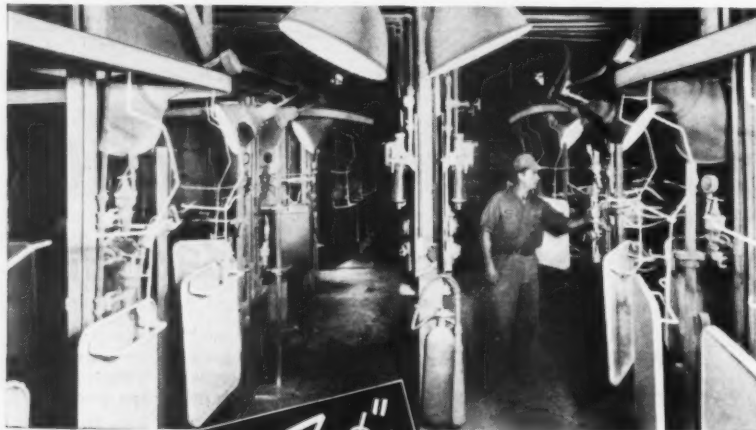


Photo courtesy Hamilton Mfg. Corp.

with R-W

"Zig-Zag"

Continuous Power Conveyor

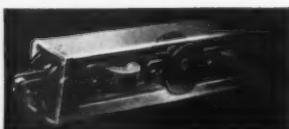
Are you prepared to get the maximum efficiency possible from your production line? Or are you face to face with a profit-eating handling bottleneck? Well, here's the answer to your problem—Richards-Wilcox ZIG-ZAG Continuous Power Conveyor.

ZIG-ZAG Continuous Power Conveyors are a patented and exclusive engineering achievement of Richards-Wilcox. You'll find them constantly at work in every type of industry—boosting production, lowering costs, solving man-power problems and raising production line efficiency.

ZIG-ZAG Conveyor Systems are remarkable for their versatility and adaptability. Their unique construction features make them quickly, easily and safely convertible to handling materials in almost any industry. Each unit is engineered to fit perfectly into existing layout and conditions.

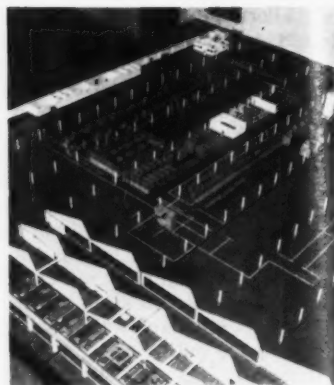
Tremendous savings in manpower costs and time pay for the installation often in less than a year's time. See how you can bring bigger profits, maximum efficiency to your production line. Check up on R-W ZIG-ZAG Continuous Power Conveyors with your nearest dealer today.

For complete details, or a prompt engineering consultation without any obligation, write our nearest office today.



Engineered for Economy and Flexibility

- Horizontal and vertical units alternate in a continuous chain traveling through special steel tubing.
- Complete flexibility for installation in any plant. Easily installed, easily changeable to conform to plant alterations.
- SAFE—all moving parts are fully enclosed.
- Low first costs. Low Power Factor.
- Standard horizontal or vertical curves—two-foot radius.



MAINTENANCE CREWS at McCulloch Motors, Los Angeles, take measurements directly from this layout table with scale models, install equipment accordingly.

What improvements on the old method does visual planning layout offer? For one thing, it converts guesswork to factual evidence, and both engineers and visionary administrative minds can focus directly on problems involved. This is important because today progress in any large industrial undertaking involves more than simply engineering. It takes all kinds of ability and vision—and continuous translations of idea and effort are required among different groups of planners so that nothing will be overlooked.

Scale model planning equipment reduces percentage of error. Participation in actual and concrete physical demonstration of ideas through group experiments is open to anyone when three-dimensional layouts are used. Thus, more mistakes are removed in the planning process, thanks to check and balance of group participation, and all thinking is translated into physical fact. No longer does the little man at the drafting board have to shoulder blame for an ill functioning plant—with visual planning there is no inefficiency.

How to Do It

Three-dimensional scale models may be had by either of two methods; they may be constructed in your shop, a proven expensive solution, or they may be bought to order from commercial firms specializing in this service—"VISUAL" Planning Equipment Co., Inc., of Oakmont, Pa., provides this kind of relief for the man at the drafting board. A commercially constructed scale model will usually come to about 1/4 the cost of making your own and will be delivered in less than 30 days.

Factual representation of the actual plant and equipment is vital inasmuch as planning of any sort can be done properly and efficiently only when every pertinent factor involved is

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known. Therefore, a complete visual three-dimensional unit should consist of an exact layout built to building prints detailed to the last column.

Floor space must be accurate as to exact area. Location of all permanent walls and temporary partitions must be placed in precise location to height of working ceiling. Overhead cranes and conveyor systems must be completely detailed. Visual layout should show wiring and piping runs and should be color coded so that they are instantly understood by all concerned with the planning.

Accurately reproduced scale models of every piece of equipment are necessary—scaled blocks won't do. While ratio runs almost universally at 6-7 pieces of non-production to 1 piece of production equipment, both are equally important in visual planning to demonstrate exact floor load conditions.

Drawing Board By-Passed

The final factor in a satisfactory visual model program is an accurate method of securing final prints to eliminate drawing and lettering formerly required of the man at the drawing board.

Simplest way to secure prints is to have one template to match each piece of model equipment. When model layout is finished, fix models with pressure sensitive cement. Invert layout, place a film grid on exposed (Lucite) back and mount templates to cover each piece of equipment. The result is a film master capable of being run through any reproduction machine.

In the case of McCulloch Motors, use of scale models enables their maintenance crew to take measurements directly from the layout boards and move or install machinery accordingly.

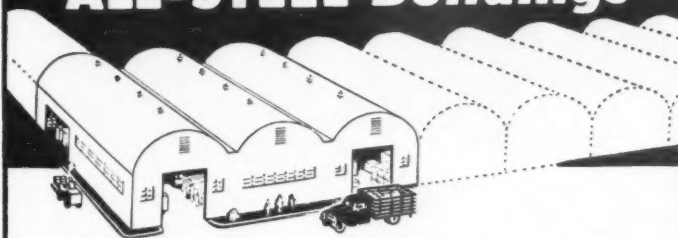
Initial cost of visual three-dimensional models is relatively expensive in comparison to two-dimensional planning, but savings in costly mistakes make the output justifiable. And the little man sweating over that drawing board can be put to a more efficient task.

BILL KILKENNY, Hyster's L. A. branch mgr. inspects models collected by **H. N. Herzikoff**, Union Bank & Trust Co.



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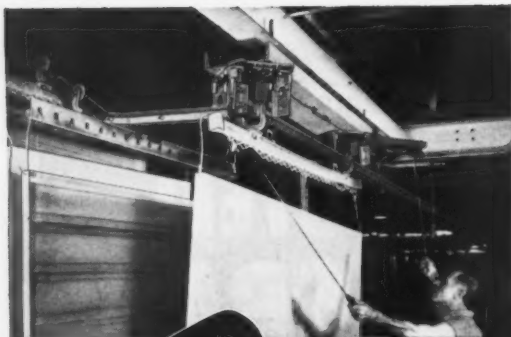


West Coast Distributors

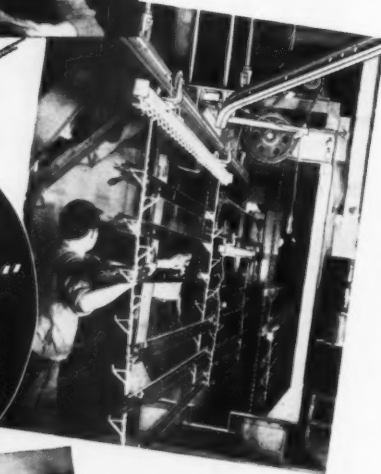
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Carriers roll off power conveyor in finishing oven to crosstrack switches for 90° transfer to shipping area.



Carriers descend through degreasing tank on power-operated chain conveyor



Solenoid operated switch automatically brings trolleys on parallel tracks into single track alignment.

A well-known metal partition manufacturer faced the problem of increasing production without enlarging building. New and better handling methods were obviously needed. They chose an American MonoRail overhead handling system as the best answer to increase capacity without increasing space and with less handling labor. Now, this American MonoRail system handles the steel components from receipt of raw materials, through finishing to shipping. The system boosted production, cut handling labor, improved space utilization, reduced material damage, bettered working conditions, and improved production control.

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Trend from sacks toward bulk

CALAVERAS Cement Company records reveal that since World War II there has been a steady trend toward bulk shipment of cement as against shipment in sacks. In 1938 only 20 per cent of Calaveras output was shipped in bulk. By 1945 the proportion of bulk shipments had risen to 57 per cent and last year it was 85 per cent.

Factors influencing this shift in marketing practice include the increased use of ready-mix, which has brought about greater shipments to bulk plants and storage silos. The use of bulk cement on large construction jobs also has helped to bring the percentage up.

In addition, bulk shipment offers price advantages. Cement is sold for 40 cents per barrel less in bulk. This amounts to 10 cents per sack. From the standpoint of the producer, costs are approximately the same. The net saving of shipping the cement is passed along to the buyer who takes delivery in bulk.

It is possible that the figures for Calaveras may be higher than those for the industry as a whole, since the company is serving an unusual number of large construction jobs.

Long-distance materials handling



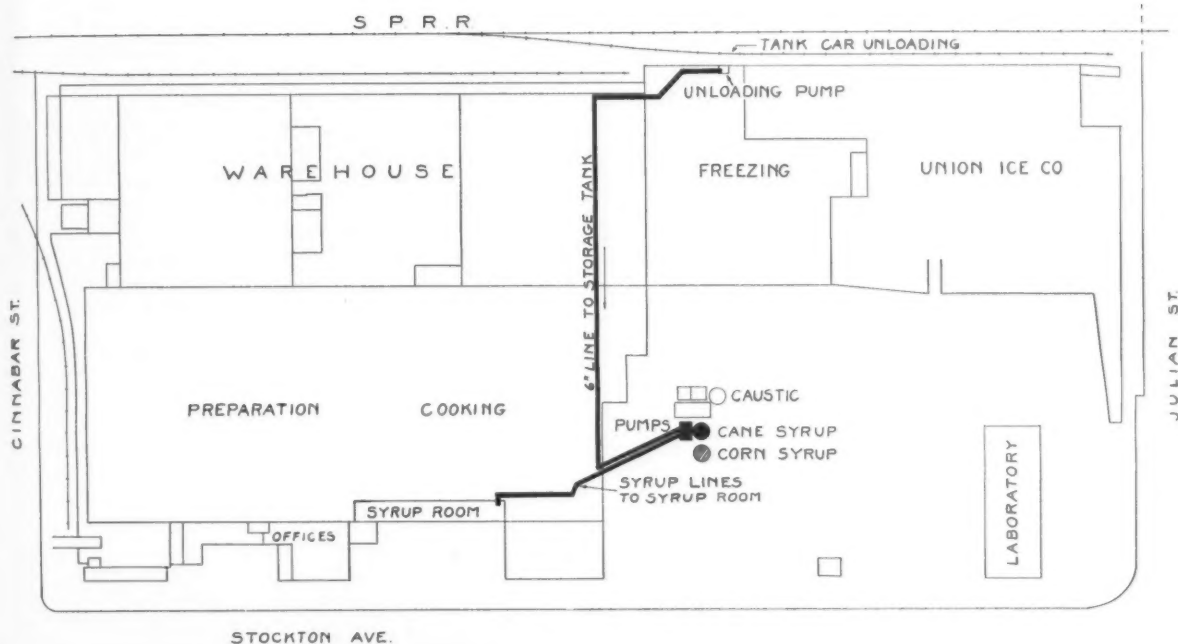
THE SIX-CAR sleeper-equipped automobile transport truck and trailer combination shown in the accompanying picture was converted from conventional equipment in the Portland, Ore., shops of Convoy Company.

Loaded, this combination stays within the axle limits prescribed in the eleven Western States. It is 59 ft., 11 in. long, and loads are under 12 ft., 6 in. high.

Convoy Co. is presently building 15 of these combinations for use throughout the nine Western states where they have ICC authority. Trucks are basically Model F-8 Fords. Lincolns and Mercurys are handled out of Los Angeles to dealers in Oregon, Washington, Idaho and Montana, and in collaboration with an eastern carrier (interchanged at Laramie, Wyoming) Hudsons and Packards are taken into the Pacific Northwest.

BULK HANDLING of LIQUID SUGAR

trims cannery's production costs



ACCORDING to the old system at Richmond-Chase Company's cannery at San Jose, California, bag crystal sugar was in customary use. Trucks loaded with bags of sugar hauled the material over the highway from sugar plant to cannery.

It Took Muscle, and Space

It took men and muscle to unload all those heavy bags, and then pile them up in the warehouse until needed in production. Relatively large warehouse area had to be provided—and it had to be kept clean, sanitary, and rodentproof.

When sugar was required in the canning process, again men and muscle had to remove the bags from warehouse, take them to a melting tank, and one by one, dump them into the tank and obtain the proper brix. From there on, the production process was pretty much automatic as far as handling the sugar was concerned.



AERIAL VIEW of Richmond-Chase plant at San Jose, Calif., shows location of liquid sugar tank in relation to plant layout. **SCHEMATIC DIAGRAM** of plant layout shows layout of pipelines, the tank positions and their relation to the production process.

Here is the way it works with liquid sugar since Richmond-Chase installed the right pumps, piping, and handling equipment:

Either a railroad tank car or a tank truck delivers the liquid at 66.5 Brix.

(Rail tankers move about 8,000 to 10,000 gals.; over-the-road tankers haul between 3,000 and 4,000 gals. per trip.)

Upon delivery, the tank cars or trucks are spotted at their respective

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unloading points, and then quickly hooked up to the plant's pipelines. In a short length of time the liquid sugar is pumped into the cannery's 25,000-gal. storage tank, and the tankers are on their way again.

Flexibility and Speed

Sugar is drawn from the storage tank as the demand arises, and it is piped directly to the production line from the system's main pump installation. Since installing this system, the use of liquid sugar has increased to the point where, at peak season, the daily consumption amounts to about 25,000 gals.

By the old system, this meant handling 1,840 100-pound bags of crystal sugar, which required a husky crew of men. (This amount is figured at the rate of 7.35 pounds crystal sugar per gal. of liquid sugar when mixed.)

Pipe lines from railcar unloading point to the storage tank are 6 in. dia., and 470 ft. long. Truck unloading point to tank is but 10 ft., of 4-in. pipe. From storage tank to production line is a total of 180 ft., made up of both 3-in. and 2-in. pipe.

Cost Amortizes Quickly

A similar storage tank for corn syrup has been installed. Total cost for both corn and cane, including the pumps and pipe, amounted to around \$30,000. All units are cleaned annually, and maintenance is so low it is practically negligible.

The entire cost of such installation in the West can be amortized in two or three years. When you figure that

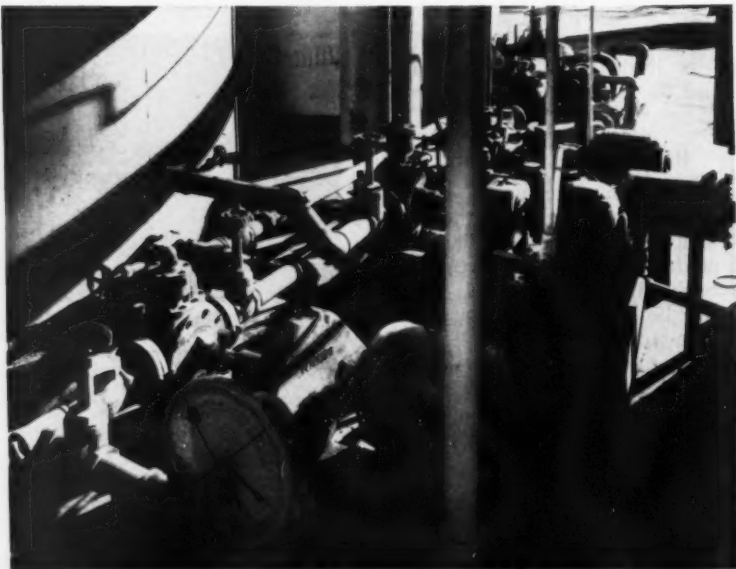
WHY LIQUID SUGAR IN BULK?

1. It costs 10¢ per cwt. less than dry sugar in bags.
2. Savings in raw material accrue, since crystal sugar in bags cannot be completely emptied.
3. All the product arrives at the purchaser's plant. There are no broken sacks of liquid sugar.
4. Liquid material handled through pipes is more sanitary than bags handled by hand.
5. Labor savings in handling are important. Fewer employees are required to handle the liquid.
6. Handling liquid material does not hold up production in the plant.
7. Warehousing is done in tanks, and the floor area of plant capacity is all available for production or other plant use, instead of warehousing bags.

some canneries lose as much as \$250.00 per min. if they are held up by a sugar shortage, the new system is even more desirable.

This system of course requires extra tank cars and storage capacities in the various sugar refineries, plus a very close contact with the truck and railroad people.

THIS BATTERY of Blackmer 3215-200 vane pumps handles the liquid sugar from either tank car or tank truck to storage tank. Maintenance cost of pumps is small.



AIR LIFTS

hoist catalysts upward

AN AIR LIFT system instead of bucket elevators for conveying the catalyst through the system is used by New Mexico Asphalt and Refining Company in their plant at Artesia, New Mexico. It is part of a Thermoform catalytic cracking unit, and features an oil well derrick type structure.

Licenser of the TCC process is Socomy Vacuum Oil Company, and operation of the catalyst cycle is as follows:

Air at approximately $3\frac{1}{2}$ pounds per square inch is introduced into the lift pot at the bottom of the structure. The catalyst is transported by the air stream up a tapered lift pipe to a separator at the top of the structure approximately 240 feet above ground level. Air and catalyst are separated and the catalyst at approximately 950° F. flows by gravity into the TCC reactor.

The reactor operates at approximately ten pounds per square inch, it being sealed from the rest of the system by means of steam injection. The bed of catalyst moves downward through the reactor and feed is introduced concurrently. On leaving the reactor the catalyst flows through a steam seal into the regenerator which operates at substantially atmospheric pressure.

Combustion air is introduced into the kiln at approximately the center of the bed. The gases formed in combustion leave the kilns at both the upper and lower ends of the catalyst bed. The regenerated catalyst which leaves the kilns at approximately $1,250^{\circ}$ flows to a shell-and-tube cooler where steam is generated on the cold side reducing the catalyst temperature to approximately $1,000^{\circ}$. Catalyst is then returned to the lift pot where the cycle is completed.

A slip stream of catalyst amounting to approximately 5% of the total circulation is removed from the separator and passed through an elutriator where the fines formed by attrition are removed, the oversize returning to the system. Make-up catalyst is added periodically by means of a small conveyor.

Exchanger bundles are kept small for ease of removal and structures over the exchanger banks are permanently installed with trolleys to facilitate maintenance. The compressor house is also equipped with a "U" shaped trolley to permit the rapid dismantling and replacement of compressor parts.

Southwestern Engineering Company of Los Angeles fabricated and installed the unit.



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GAS BOTTLES RECONDITIONED

*faster by a new low-cost system with
clever materials handling as the key*

THE OLD—Wire brushing and spray painting under a shelter. **THE NEW**—Automatic loading, conveying through all the blasting and paint spray operations. **THE RESULT**—Greater speed using less manpower

TIME SAVERS are waste savers and O'Brien Industrial Equipment Co. of San Francisco has developed for the Department of Public Works at Moffett Field, Calif., a fine "saver" system to recondition helium bottles received for testing and filling.

More With Less

Under old method, bottles were placed in long rows beneath a shelter, wire brushed to remove loose paint and were then sprayed by hand spray guns. With installation of new and improved unit, production of finished bottles has

jumped from 30 to 40 or 45 per hour. About 1/3 less paint is used, giving greater protection to the bottles and eliminating a large volume of paint fumes. Only three men are required to operate the system.

An automatic loading device is provided with a conventional vertical barrel type elevator controlled by limit switches to feed bottles as needed to blast cabinet by feed conveyor.

In process of removing old paint and scale, a "Vacu Blaster" machine hits surfaces with a hard stream of steel shot coming from nozzles introduced through top of the blasting chamber.

Bottles are carried along and rotated by angular rotating wheels in the cabinet. They then leave blasting cabinet for inspection conveyor and are transferred by air cylinder to painting conveyor.

Special Rolls on Conveyors

Wet painted bottles must be transported to the prime paint dryer without removing sprayed paint or producing objectionable marks. For this part of the job, angular type rolls especially designed by O'Brien are used on the paint conveyor to carry bottles through paint spray in horizontal position for a dual application. As bottles reach prime dryer, they come into contact with an air activated lift which removes bottles from painting rolls. After the bottles are picked up in this manner, an air activated indexing device takes them into the prime dryer.

Bottles are indexed through the dryer, lowered to the second painting level and then placed on finish painting conveyor. Finish or second coat of paint is applied in same manner as the prime coat only moving at a lower level through the same spray booth.

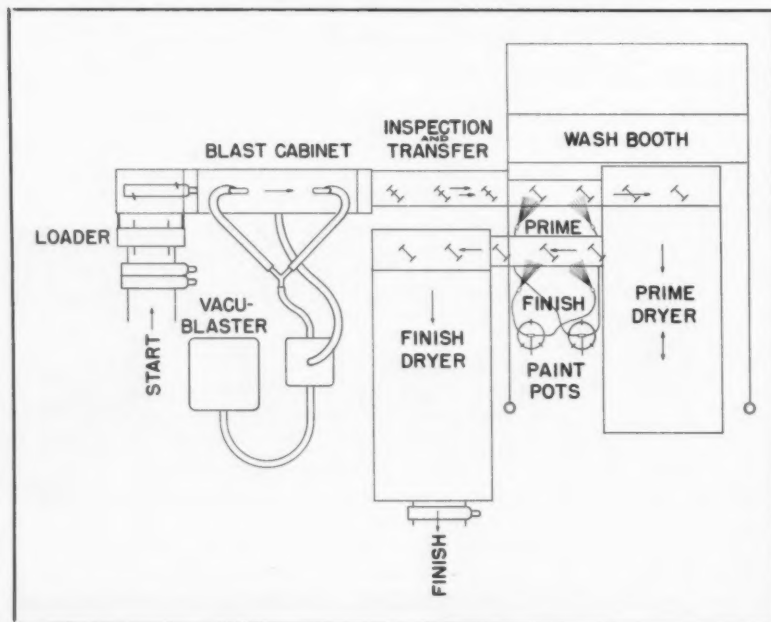
As bottles reach the finish dryer, they again come in contact with an air activated lift and roll out of the dryer. A bottle up-ender finishes the job.

What Makes It Work

Variable speed produced by U. S. Varidrive motor is the power behind all conveyors used in this system.

Paint spray heads and both dryers are activated by air limit switches, interlocks and time delays. These air devices, which can duplicate the functions of an electrically activated and interlocked system, are a product of Westinghouse Air Brake Co., Industrial Division.

FLOW SHEET shows arrangement of component parts of new system designed to cut costs and time in reconditioning gas cylinders. System applies to acetylene, oxygen, helium and others commonly packaged in conventional gas containers.



LEGAL TEETH FOR EMPLOYERS

... to chew on union activity supplied by recent high court decisions in Utah and San Francisco

ACCORDING TO A TREND established by recent high-echelon court decisions, things from now on won't be so rosy for unions and their members who pull a strike at the drop of a hammer or who try to exert a squeeze-play on one member of an industry in the effort to force the whole industry to come to the union's terms.

Now, the employers can set up a term or two of their own—and do it legally. Briefly, here is the crux of these decisions:

1. In Utah, the State Supreme Court ruled that employees who assist in strike activity in Utah industrial establishments are not entitled to unemployment compensation benefits. (See *Western Industry*, June, 1952, p. 72.)

2. In Utah also, the same court ruled that when a labor union strikes one company where industry-wide bargaining is carried on, management of other companies in the group may close down and union employees thus thrown out of work cannot be paid unemployment benefits. (See *Western Industry*, June, 1952, p. 72.)

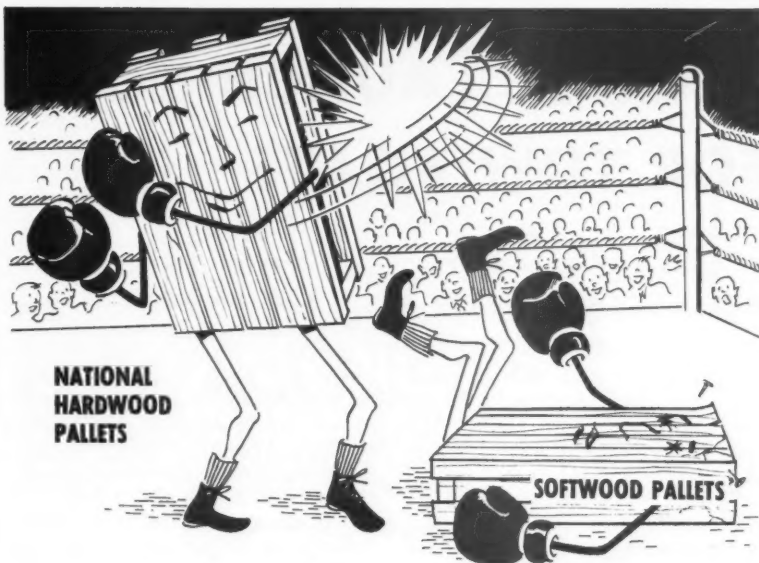
3. According to a decision rendered on May 29, last, (in the Davis Furniture case) by the United States Court of Appeals for the Ninth Circuit at San Francisco, that court vindicated the right of the members of an employer bargaining group to shut down in support of a struck employer.

This decision preserves multi-employer bargaining as it has been known and conducted not only in the San Francisco Bay area, but extensively throughout the far West.

A Word of Caution

From San Francisco Employers Council, comes a note of caution in the light of this third decision. The Council suggests:

"In all future lockout cases the employers should make it clear that their intent in locking out is to bring pressure upon the union to *accept the employers' proposal*, and should make it abundantly clear that they are not locking out for the purpose of "busting" the union or discouraging membership in the union. The Davis Furniture decision stabilizes the law only upon the particular facts of that case. A wise and prudent course would be to secure expert legal advice *before* locking out."



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DERRICK LAUNCHING FOR TOW BOATS

*Method common with smaller craft
applied successfully to 95-ft. vessels*

LAUNCHING two 125-ton steel hulled tow boats presented Pacific Coast Engineering Co. of Alameda, California, with a weighty materials handling problem recently.

As their ways were occupied by other craft under construction and the Ship Owners and Merchants Towboat Co. wanted the 95-ft. long vessels as soon as possible, it was decided to construct them on the end of the dock and launch them by means of derricks.

This method of launching had often been used with smaller craft but to their knowledge had not been attempted previously in the West with vessels of this size. The Smith Rice Co., San Francisco marine contractors,

were called upon to do the launching.

Construction of the hulls, minus engines and superstructure, but with shaft, propeller and rudder installed, was completed in four months by using prefabricated sections that were easily set in place and welded on the improvised ways. To facilitate handling the prefabricated sections with their rail-mounted cranes, they built the hulls so that when ready for launching they were resting at an angle of 45 deg. to the end of the dock.

Launching, which took two hours, consisted basically of rigging slings around a hull, lifting, aligning hull with the edge of the dock, backing barges away from the dock, and lowering hull into the water. Once the



first hull was in the water a tugboat pulled it from between the barges and the dock to permit barges to move into the dock for launching the second hull.

Rigging Hulls

To lift the hulls, slings were placed under them at four points where transverse bulkheads extended solidly through them to prevent any caving action during the work. Hulls were protected from scratching by insertion of wood blocks under the slings.

Two sets of four slings were used, one set about 25 feet aft of the bow, and the other about 25 feet forward of the stern.

The stern slings, where there was more weight due to the presence of the shaft and propeller, consisted of two 2-in. 44-wire cables passing under the hull from gunwale to gunwale, and two 1½-in. 50-wire cables attached to the ends of the under cables with U-bolts, connecting them, and providing a loop at each side of the hull for the derrick's hook. The forward sling consisted of two 1½-in. 50-wire cables under the hull and two 1½-in. 60-wire cables linking them to the hooks.

Derricks

As the boom of one derrick was only 32 ft. from the edge of the barge on which it was mounted and the other was 52 ft., it was possible to fix them 82 ft. apart when setting them in against the edge of the dock. The proximity of the booms permitted a straight lift along the 95 ft. length of the hulls with each unit raising its proportioned weight. It further permitted aligning the hulls with the dock edge by booming in, or raising the angle of



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**MATERIAL HANDLING
EQUIPMENT**

the boom instead of swinging it horizontally.

While holding the hull aloft during the launching the equal sharing of the load provided maximum safety to the equipment when lines holding the barges to the dock were cast off. The barges, held in tandem, utilized lines attached to offshore anchors to pull themselves away from the dock and provide room to set down the hull.

The derrick used for the aft section of the hulls, (Smith Rice #3) is classed as a swingline A-frame with stiff leg and has a 100 ton capacity. It has a liting radium of 76 ft. i.e., it can apply its full capacity for lifting up to 76 ft. from the base of the boom. This derrick is rigged with 11 parts of 1-in. cable.

The derrick for the forward part of the hulls, (Smith Rice #4), is classed as an A-frame boom stepped 38 ft. above the water. Base of the boom is 38 ft. above the barge's waterline. Rigged with 9 parts of 1 1/4-in. cable this derrick has an 80 ton capacity and 72-ft. lifting radius.

Pacific Coast Engineering Co. general superintendent Norm Roberson was in charge of the construction with E. J. Mutinsky as assistant superintendent. George Mitchell, general superintendent for Smith Rice Co. carried out the launching. Riggering for the lift was primarily Macwhyte wire rope.

Tractors take a powder

HELENE CURTIS Industries, Inc., Chicago, cosmetic manufacturer, purchases all capital stock of Gibson Manufacturing Corp., Longmont, Colorado, a tractor manufacturing firm.

The Gibson plant will continue production of farm tractors, fork lift trucks, crane and warehouse tractors and will be operated as a wholly-owned subsidiary of Helene Curtis according to Gerald Gidwitz, Curtis president. At present, Gibson holds government contracts worth several million dollars for producing this line of equipment.

Curtis may add additional manufacturing facilities to the Gibson plant, as intentions are to extend production of its fork lift trucks and tractors to enter the commercial and industrial field and to set up a nation-wide distribution organization for this purpose.

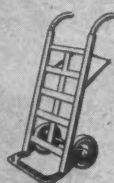
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DRUM TRUCK



FOR GENERAL USE



FURNITURE TRUCK



KEG TRUCK



TRUCK SELECTION CHART



"LIFT JACK" MATERIAL HANDLING SYSTEM



LOAD 'EM UP, JACK 'EM UP AND ROLL

STACK 'EM UP



BOX OR CRATE DOLLY



REFUSE CAN DOLLY



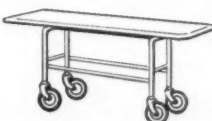
PIANO DOLLY



FURNITURE DOLLIES

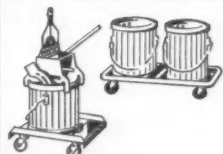


MILK CRATE DOLLY



WHEEL STRETCHER & HOSPITAL EQUIPMENT

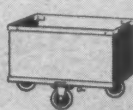
DISH TRUCK



MOP TRUCKS



CANVAS BAG TRUCK



TANK TRUCK

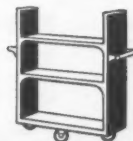
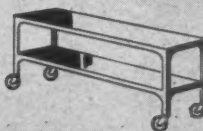


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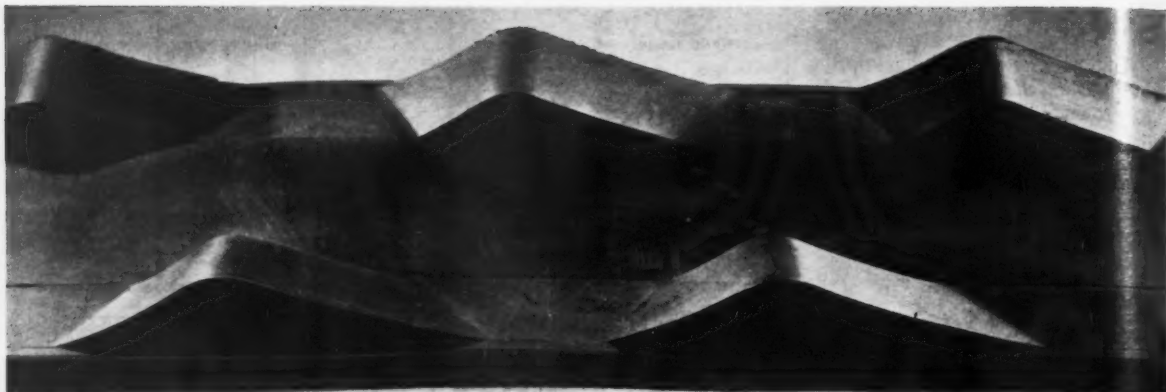
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HULA COOLER gives fair shake to cans

Alternate cleats on conveyor belts through cooling spray gently rock heat out of cans

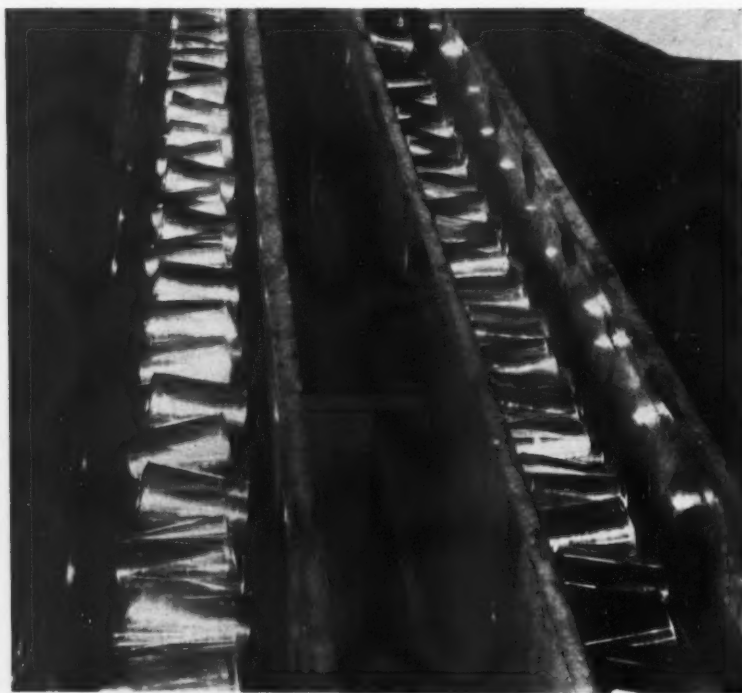
UNIQUE APPLICATION of conveyor belting cuts costs and saves time in Hapco (Hawaiian Pineapple Co.) Cannery, one of Dole Pine-

apple Co.'s largest packing plants in the Hawaiian Islands.

Pineapple is packed at 195 deg. F., and must be cooled to 90 deg. F. before

labeling and shipping. Heretofore, plain and simple cold storage—and many hours of it—were required to reduce temperature. Then Dole engineers conceived the idea that hot cans could be continuously shaken in cold water to insure quick cooling of entire contents instead of cooling only the outside layer of fruit.

CANS START trip at 195 deg. F. and slowly rock during 5-min. trip through cold spray (shut off to obtain this view). Temperature at end is 90 deg. F. and cans are ready for labelling and shipping.



Built-in Undulation

Working in close cooperation with Dole engineers, Thermoid Co. of Trenton, N. J., designed two 4-ply, 200-foot-long and 6-inch-wide conveyor belts with black rubber cleats spaced alternately along the sides of the belting. Cans are continuously rocked as first one and then the other end is raised and lowered to roll cans over the cleats.

Hot cans are placed on the conveyor at bottom of a rising slope and cold water is continuously directed on them. Belt speed and inclination are computed to insure five minutes of travel on conveyor under cold water spray, time enough to reduce can temperatures to 90 deg. F.

Less Time in the Cooler

"Hula Cooler," as this type of belt conveyor is popularly known, eliminates 18 to 48 hours of cooling storage time and permits direct delivery from processing to labeling and shipping. Patent application for this process has been made by the Dole Pineapple Co.

Don't overlook **CONVEYOR PULLEYS** your

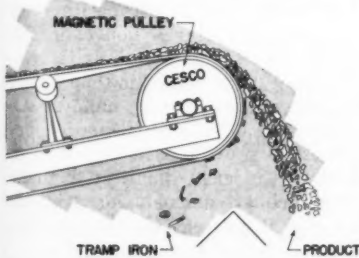
By JOHN E. HYLER

PULLEYS used with belt conveyors are highly important. Much depends upon having the right type of pulleys for given installations.

Because rubber-covered pulleys considerably increase traction, especially where conditions are damp or wet, it is very important to use a rubber-covered pulley in such instances. Traction is increased anywhere from 10% to 20%, provided contact between conveyor pulley and belt is clean, or where dust from materials handled is damp.

Rubber-covered pulleys, however, should not be used under very dry and very dusty conditions, where clays, coal or similar smooth material is being handled. They will decrease traction under such circumstances, rather than increase it.

Belt conveyor pulleys may be had either crown or straight-face construction, but the advantage of having a crown in the pulley face, in reference to making a belt track better, is well known. Therefore, most pulleys are provided with a crown.



SKETCH of magnetic pulley in action removing tramp iron.

Courtesy Columbia Engineering Service.

Various pulleys for belt conveyors are of welded-steel construction. These generally have closed-end discs, which make it impossible for material to accumulate inside the pulley. This provision is good from the standpoint of keeping pulleys in better balance, and is also very helpful where material being handled might cause contamination.

In cases where extra-heavy belt conveyor service must be provided, particularly heavy pulleys are employed, and may be obtained from different conveyor manufacturers.

There are various instances in which belt conveyor pulleys employed do not provide an unbroken surface for contacting the belt. So-called slatted pulleys, for instance, are distinctly advantageous for head and foot pulleys on belt elevators, also for conveyors handling sticky, gritty, or sharp materials which tend to adhere to the under



JUST AHEAD of sawmill fuel hogs at Weyerhaeuser Timber Co., magnetic pulley removes tramp iron.

Courtesy Stearns Magnetic, Inc.

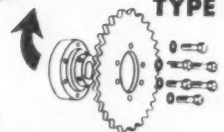
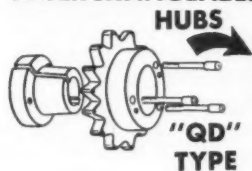
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Replacement sprockets can be used on old hub, which reduces cost of replacement sprocket.

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side of the belt, either building up on the pulley, or cutting the belt. Faces of such pulleys consist of a series of steel slats, which have been welded to steel discs at the two ends.

Dual Cone Sheds Dirt

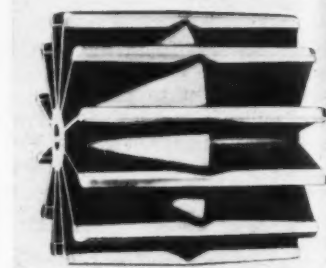
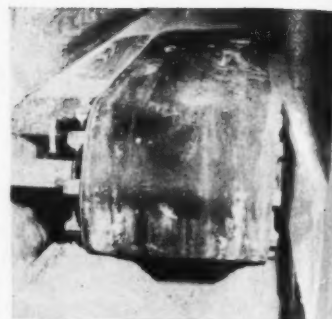
Usually, a double cone arrangement is provided inside the slatted periphery, so that such dirt or material as falls through the slats will automatically be diverted toward the end discs of the pulley (if it has such discs) and passed out through generous openings in those discs. However, different pulleys of this general type have been provided which contain no end discs. It is particularly important to use a pulley of this general type on the foot-shaft of a bucket elevator, whenever there is any tendency for material to pack between the belt and the pulley.

Certain belt conveyor pulleys are specially designed for rough service conditions, where hard and abrasive materials must be handled, but are also employed for various other types of duty. These pulleys are very easy on conveyor belts.

Instead of having welded-on slats, they have a series of ribs or wings, extending radially from the central hubs. Interposed between these wings are conical sections, which serve to make the pulleys self-cleaning. A pulley of this type will actually outlast a solid-face pulley, because it eliminates all grinding action.

Absence of grinding action also prolongs belt life. The ribs or wings of such a pulley will not break under the roughest operating conditions. It cannot possibly damage a conveyor belt, because its ribs are perfectly smooth, free from sharp edges and corners, and close enough together to prevent any severe crimping or flexing of the belt.

Belt conveyor pulleys of this general type should be used from the standpoint of preventing accidents, if from no other. They make it unnecessary to indulge in the dangerous practice of scraping foreign material from the under side of conveyor belts while



FEED PLANT installation (top). Conveyor runs over ribbed or winged pulley of self cleaning type shown in foreground. Winged or ribbed belt conveyor pulley (bottom) is type that's easy on belts carrying hard abrasive materials.

Courtesy Sprout Waldron & Co.

they are operating. Need for cleaning such belts is completely eliminated. Such pulleys are available in diameter sizes up to 40".

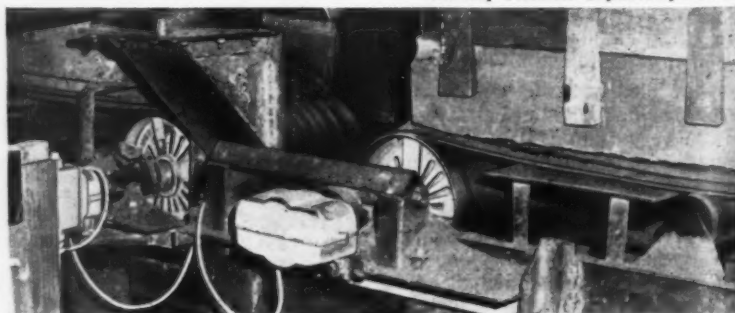
Extra Reinforcements

It is standard practice with some manufacturers of belt conveyor pulleys to provide them with extra reinforcement discs, welded in their center length, whenever such pulleys run wider than 26". It is also very important to provide such pulleys with shafts of sufficient diameter to make them adequate not only for strength, but also to prevent excessive deflection.

In some cases the mistake has been made of attempting to reduce shaft diameter by using stronger, alloy steel

PERMANENT magnetic pulley of the non-electric type.

Courtesy Columbia Engineering Service.



shafting. This is not to be recommended, however.

One should abide by a generous shaft diameter on all belt conveyor pulleys. Really, where unusually heavy loads are to be handled, or where pulleys are of exceptionally large size, load conditions should be carefully specified when the pulleys are ordered. In fact, any unusual or severe conditions existing should be specified. Where desired, conveyor pulleys are available with special taper-lock hubs.

In considering belt conveyor pulleys, one should not overlook magnetic pulleys. Using a suitable magnetic pulley on a belt conveyor, tramp iron may be and is eliminated from coal and various other products, thus avoiding damage to crushers, grinders, pulverizers and other machinery. Many shut-downs are avoided through use of suitable magnetic pulleys.

Such pulleys are available in both non-electric and electro-magnetic types. They are also employed for separating ferrous from non-ferrous materials, and for concentration of magnetic ores. Some of the more-modern magnetic pulleys are designed with removable coils and bobbins, with integrally-cast pole shoes, and with special alloy coil covers.

A few pulley manufacturers

1. Welded steel pulleys for belt conveyors are available from Jeffrey Manufacturing Company, Columbus, Ohio, from Link-Belt Company, Chicago, and various others.
2. Slatted pulleys of the general type described, having end discs and generous sized holes passing through those discs, are made by Jeffrey Manufacturing Company, Columbus, Ohio.
3. Welded steel slat pulleys of the type having no end discs are available from Link-Belt Company, Chicago.
4. Belt conveyor pulleys of the winged or ribbed type mentioned, and having the other characteristics cited, are a product of Sprout Waldron & Company, Inc., Muncy, Pennsylvania.
5. Conveyor pulleys fitted with taper-lock hubs are available from Dodge Manufacturing Corporation, Mishawaka, Indiana.
6. Magnetic pulleys having removable coils and bobbins, integrally-cast pole shoes, and special alloy coil covers, are made by Magnetic Engineering and Manufacturing Company, Clifton, New Jersey.
7. Other leading manufacturers of magnetic conveyor pulleys include Eriez Mfg. Co., Erie, Pa., Homer Manufacturing Company, Inc., Lima, Ohio; Cutler-Hammer, Inc., Milwaukee, Wisc.; Stearns Magnetic Manufacturing Co., Milwaukee, and Dings Magnetic Separator Company, Milwaukee; Columbia Engineering Service Co., San Francisco, Calif.

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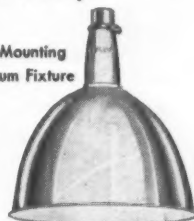
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SAFE LUMBER LOADS

... on open top cars, if you follow recommendations for use of stickers, segregation, one square end

JOINT STUDY of the problem of loading lumber on open top railroad cars to avoid shifting, made by the California Public Utilities Commission and the Northwestern Pacific Railroad, have resulted in the following recommendations:

1. Use stickers with a maximum width of four inches, maximum thickness of one-half inch, with only set of stickers per unit of lumber, and see that these stickers are placed between the units of lumber.
2. Make a greater segregation of lengths, so there will not be a variation in lengths of lumber in one unit greater than four feet, as covered by AAR rules.
3. Load units with one end square, and place the square ends to the center of the car. The units should be close together in the center of the car.

Delays Avoided

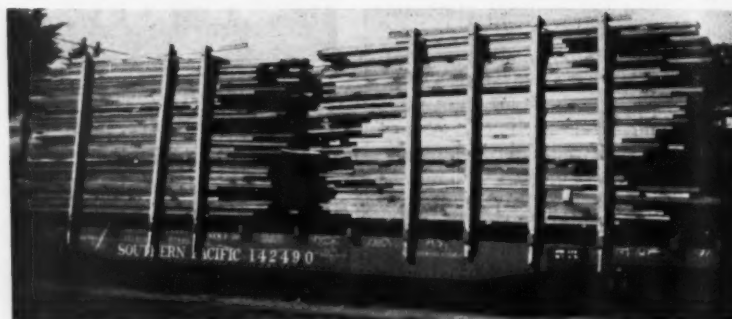
Lumber shipments handled in this manner have avoided delays resulting from the placing of cars on rip tracks to shift loads and have reached desti-

nation in excellent shape. Pictures taken by the Southern Pacific and Santa Fe to show shippers some of the transportation problems in handling

lumber over mountain grades and curved track have been shown to lumber shippers at meetings held in the redwood region.



THIS ▲



NOT THIS ▼

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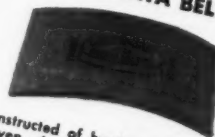
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... for wire locking holes through side of a bolt head or nut is simple and adaptable for special jobs

THIS FIXTURE was developed by Monte E. Hover Engineering Co., Culver City, Calif., to drill the wire locking hole through the side of a bolt head or nut. It is adaptable to round, square or hexagon bolt heads or nuts, and it will handle any size from 0-80 to 2½ in. diameter over the hexagon.

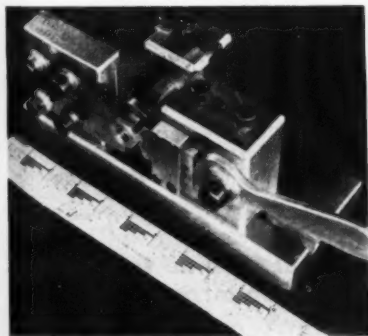
For Special Uses

Tool is simple to build and any shop can have one assembled to fit its special requirements. Using a coolant with this setup, an operator can drill from 250 to 255 nuts an hour.

Jig is clamped in drilling position on drill press table, which does away with small drill breakage; and a quick-action cam lock clamps into place the part to be drilled. This feature makes for rapid loading and unloading.

Few Parts to Change

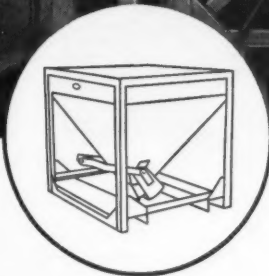
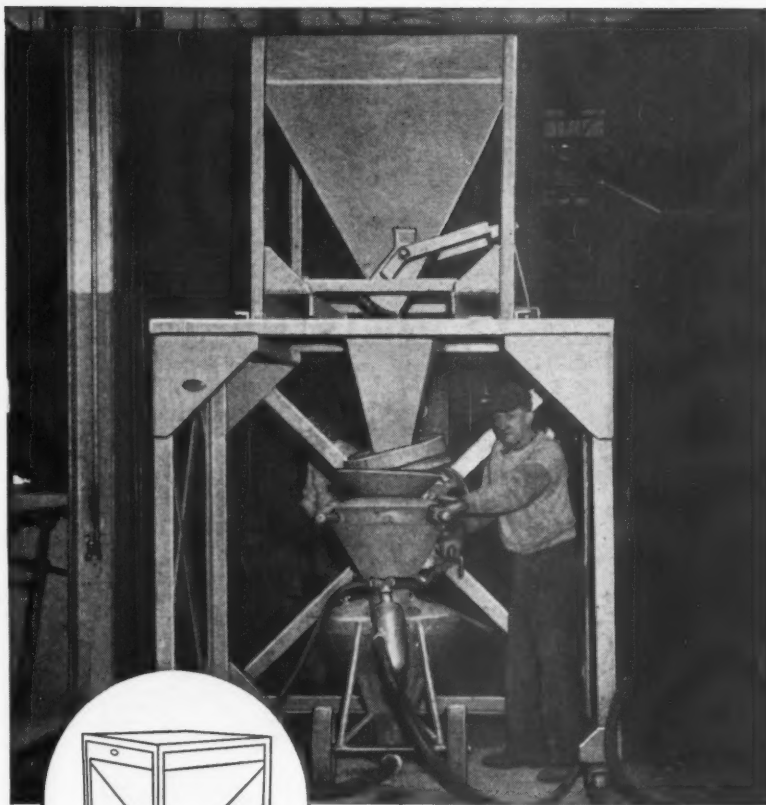
Only parts which must be changed are drill plates, and this is only necessary when drill size is changed. Drill plates are usually made of Starrett



FIXTURE with a ¾ hex nut clamped in drilling position and a #50 drill in the upper drill plate. Fixture is now ready to be clamped to drill press table.

stock or equivalent tool steel, and the rest of the fixture can be built of duralumin or cold rolled steel.

Illustration shows fixture ready to clamp to drill press table with a ¾-in. hex nut clamped in drilling position and a No. 50 (.070) drill in upper drill plate. Next step would be to put a No. 50 drill blank in drill press chuck and adjust drill press table or spindle assembly to about 1/32 in. above top of drill in fixture. This drill would then be lined up with drill blank and fixture would be clamped into that position. As soon as drill blank is removed and drill inserted, operator is ready to work.



Specially designed hopper bucket makes cupola lining more efficient. Bucket is placed on frame by use of a lift truck.

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Whatever the bulk-material handling problem in your plant, Penn Iron Works, Inc., will be glad to help with its solution. Our wide experience in designing and manufacturing all types of buckets and special handling equipment for foundries can help you cut costs . . . save time . . . increase efficiency.

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READING, PENNSYLVANIA

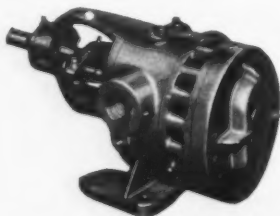
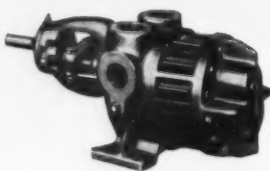
Pumps

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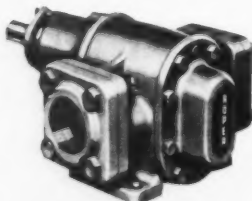


SERIES H

Widely used for hydraulic mechanisms and other applications where high pressures are required. Spur gears provide high volumetric efficiency. Packed box or mechanical seal. Pressures to 1000 P.S.I.—5 to 75 G.P.M. sizes.

SERIES K

For hydraulic service, fuel transfer or fuel supply. Features helical gears and exclusive Venturi suction and discharge principle in 10 through 50 G.P.M. sizes. Packed box or mechanical seal. 150 P.S.I.—3/4 to 50 G.P.M.



SERIES 3600

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Aviation workshop work-out for Calif. educators

NORTHROP Aeronautical Institute of Hawthorne, a division of Northrop Aircraft, Inc., has invited nearly 3,000 educators, representing science and mathematics instructors and principals from high schools and colleges throughout California, to attend two workshop sessions this summer.

Workshops, to be held July 24-25 and August 14-15, are designed to acquaint secondary and higher education leaders with present and future needs of the aircraft industry. Training needs, methods, equipment and curricula requirements for aviation careers will be discussed at the two sessions.

Increasing shortage of qualified engineers plus constant demands for such personnel placed upon Northrop Institute by aircraft industry are behind these workshops, according to James L. McKinley, institute director. "Day by day, it is becoming more obvious that with a high school education alone a man cannot successfully compete in today's exacting aeronautical engineering profession," he asserted.

California State Department of Education officials concerned with aviation education will participate in the educational activity. Outstanding aircraft executives and industry personnel will take part in the sessions. Tours of Northrop Aircraft's Scorpion F-89 production lines and courtesy flights over south bay area in a commercial plane are planned for attending educators.

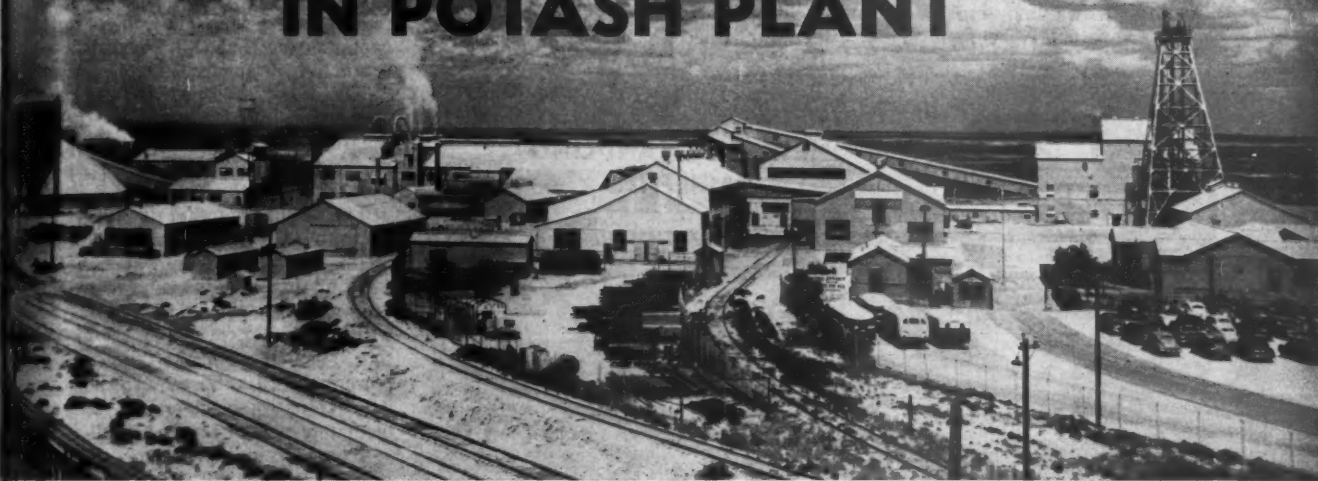
Helical carbide tool speeds precision aircraft work

A CUTTING TOOL design, developed at Boeing Airplane Co., Seattle, not only enables standard milling machines to shape certain airplane structural parts more accurately, but almost three times as fast as cutters previously employed.

Cutter, formed from carbide, is designed for use on helical or spiral tool bodies, where only steel cutting tools could be used before. It takes a machinist, using this tool, only seven minutes to make a 76-ft. long cut on an aluminum alloy wing stiffener with the resultant roughest spot on machined area only one-thirtieth the thickness of an average human hair.

Using a straight edged carbide cutter, this same job would require 20 minutes; and three-quarters of an hour would be consumed if the same part were machined by old high-carbon-steel helical cutter methods.

810-ft. BELT CONVEYOR IN POTASH PLANT



Handling ore underground also calls for air-operated rotary dump which empties 6-ton ore cars in 20 seconds

POTASH, one of the three principal ingredients of commercial fertilizer, is extensively mined and refined near Carlsbad, New Mexico. Four large underground mines are now in production and a fifth mine is scheduled to begin production in August of this year.

Mining of potash in the Carlsbad district began in 1932, and these five plants represent a capital investment of over \$50,000,000. The value of the refined potash salts produced by three of these companies in 1951 exceeded \$40,000,000.

The Material

The potash beds are of sedimentary origin and were deposited during Permian times. The chief potash ore mined in the district is known as sylvinite, and is a mixture of potassium chloride (KCl) and sodium chloride (NaCl).

This sylvinite bed varies in thickness from three to 12 feet. It is rather flat, as the regional dip is about 90 feet to the mile and its depth beneath the surface is between 900 and 1,500 feet.

Late in 1940 the potash division of

International Minerals & Chemical Corporation began mining potash in the Carlsbad district, and production since that time has been on a three shifts per day, every day in the year, basis. The mine and surface plant are modern in every way and all operations are highly mechanized. Labor rates are high and counting fringe

By
H. L. GARDNER
Mine Engineer
Potash Division,
International Minerals
& Chemical Corp.
Carlsbad, New Mexico



benefits and workmen's compensation, employees in the potash basin are among the highest paid in the United States.

The large tonnages of ore mined at International are mechanically loaded into mine cars and hauled to the bottom of the ore hoisting shaft. Here, the ore is unloaded, crushed, loaded into

six-ton skips or buckets and hoisted 1,000 feet up the shaft to the surface.

From surface bins, the ore is conveyed by belt conveyors to the crushing plant where it is further reduced in size. Conveyors and elevators then transport the crushed ore to the refinery where the worthless salt is removed. The refined potash is then dried in rotary driers and stored in a large warehouse.

Different grades of potash are produced, and while the bulk of the production is loaded into railroad cars for shipment to the fertilizer mixing plants, bagging facilities are provided for the customer who prefers his product to be in bags.

Handling Problems

International has recently completed a \$3,250,000 project in the mine which will handle ore from the southwest extension of the present ore body. This work was all done without interfering with current mining operations from the northeast portion of the ore body. One of the problems involved in laying out the new development program was to bring the ore from the southwest to the bottom of the hoist-

ing shaft and there blend it with the ore from the northeast.

Ore from the southwest is delivered to the shaft area by ore trains consisting of 30 cars, each car having a capacity of over six tons of ore. At a point some 800 feet from the shaft, these loaded mine cars are fed by gravity through a rotary car dumper. It is not necessary to uncouple the cars as they go through the dump, since the cars are equipped with swivel couplings.

The rotary dump is of the air-operated type, and it can dump a loaded car in 20 seconds. The ore, some pieces of which may measure $2\frac{1}{2}' \times 2\frac{1}{2}' \times 3'$, falls into a heavy steel hopper and thence onto a $60'' \times 13' 10''$, center to center, apron feeder which has a speed of 12 fpm. The feeder pans are of manganese steel and are $\frac{3}{4}''$ thick.

Ore is discharged by the apron feeder into a $36'' \times 54''$ Jeffrey single-roll crusher which reduces the ore to

a 5" size. The crushed ore, which weighs 85 pounds per cubic foot, falls into a large storage pocket which was excavated in the rock salt. The pocket measures $20' \times 20'$ in cross section, and about 76' on a 60° slope. The capacity of the pocket is 1,200 tons.

Conveying Crushed Ore

Crushed ore is drawn out of the pocket onto a $48'' \times 11' 3''$, center to center, apron feeder which has a speed of 26 fpm. Manganese steel pans are $\frac{3}{4}''$ thick and the skirts and discharge chute are also of manganese steel. A Stearns $54'' \times 42''$ suspension magnet of the rectangular type is suspended over the end of the feeder.

The secondary feeder discharges the ore onto a $30'' \times 810'$, center to center, incline belt conveyor which has a 173' 6" lift. The Goodyear belt is known as the Compass 100, Style "B," with $\frac{3}{16}''$ top cover and $\frac{1}{16}''$ bottom. The belt travels 350 fpm., and is powered by a 100-hp. motor. The gravity take-up is in a vertical well immediately behind the head pulley.

This belt discharges the ore into what is locally known as the No. 1 Raise, which is connected with the old ore pocket at the bottom of the ore hoisting shaft. It is the same pocket which has handled the ore from the northeast portion of the mine for the last 12 years.

Conveyor Between Pockets

Surface operations are smoothed out as a result of the new pocket and the belt conveyor. The old pocket at the bottom of No. 1 shaft is very small, and if trouble should occur in the mine whereby the flow of ore to this pocket is interrupted, the surface refining operations would soon run out of ore if this was the only surface of supply and either cut down the feed or necessitate closing down entirely.

The new pocket will hold 1,200 tons

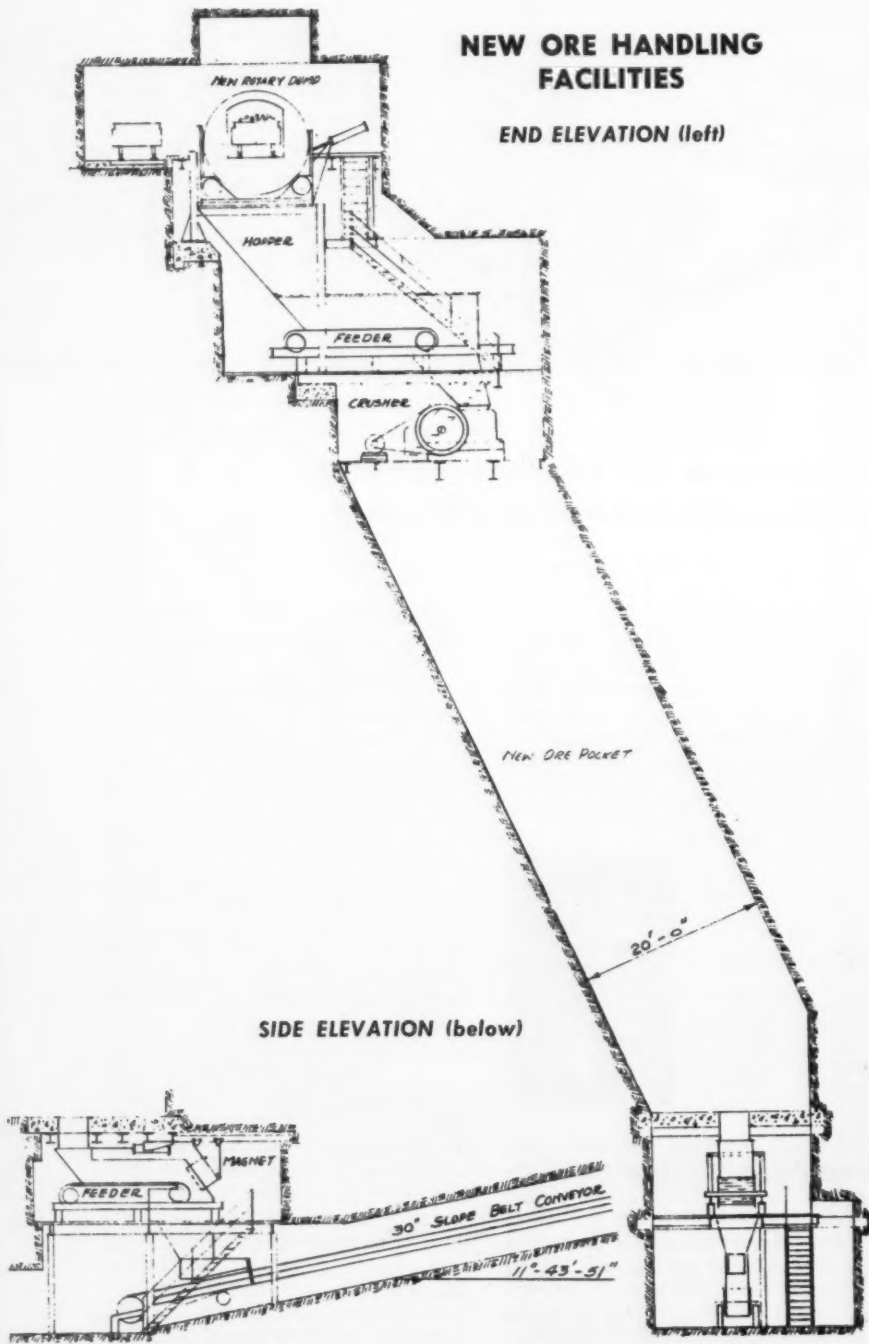
VIEW DURING construction shows installation of the new air-operated rotary dump.



NEW ORE HANDLING FACILITIES

END ELEVATION (left)

SIDE ELEVATION (below)



of ore and by installing the belt conveyor between the two pockets, the chances that the hoisting of ore will be interrupted by running out of ore are considerably lessened.

Master Controls

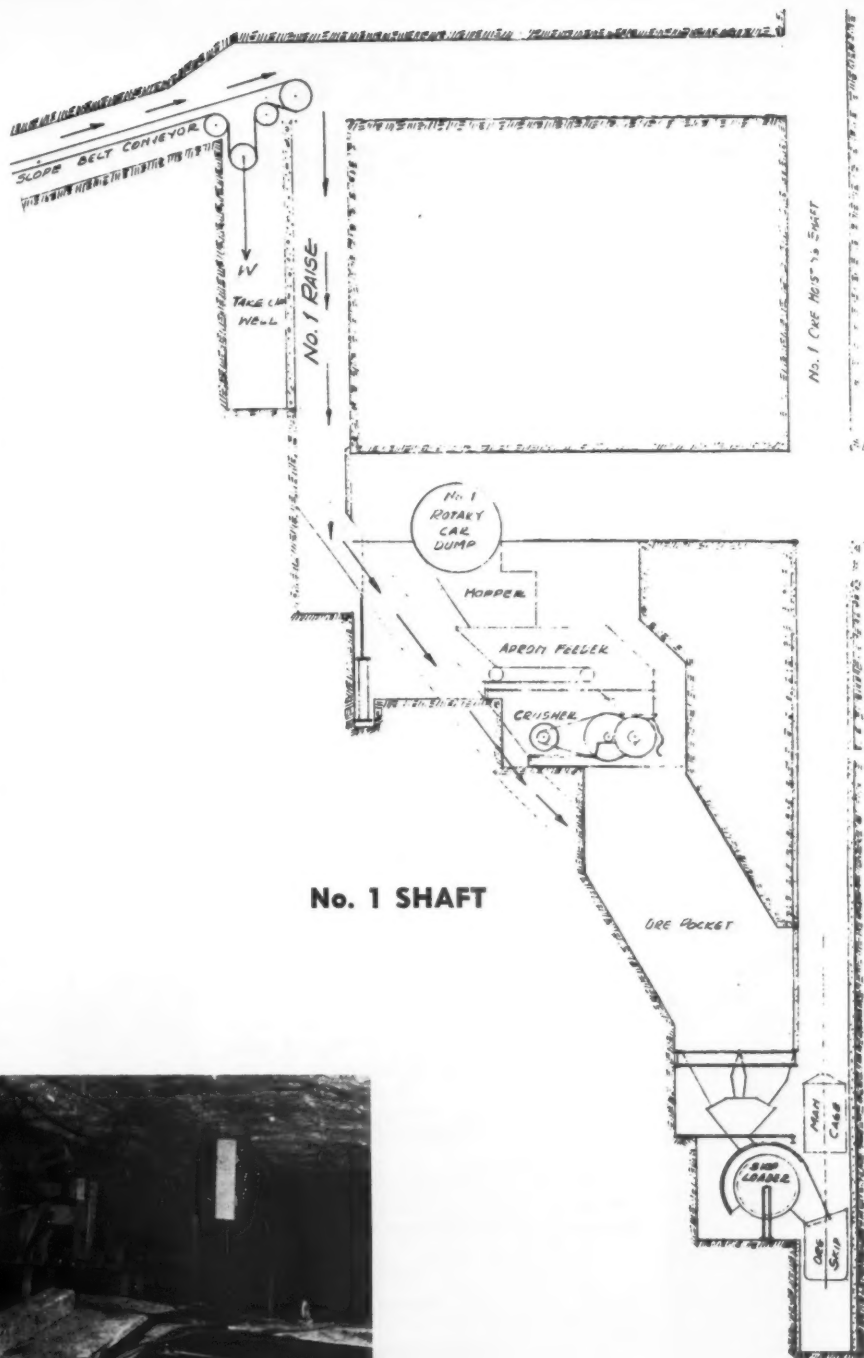
A totally-enclosed, centralized master panel board is located at the rotary dump, where it is under the constant scrutiny of the operator who is on duty there at all times. A communication system is incorporated in the panels for convenience of the operators during emergencies and routine maintenance. Safety devices in the form of colored lights, sirens, and tell-levels are located at strategic locations.

Before any of this equipment could be installed, the excavation of the underground chambers had to be completed. A slope was driven in the solid salt for the belt conveyor. This slope measured 7' high x 12' wide and was driven down a 12° slope for a distance of 825 feet. A chamber was then excavated between the lower end of the slope and the rotary dump, a vertical distance of 127 feet.

Who Did It

International forces did the excavation work, the Stephens-Adamson Manufacturing Company, of Los Angeles, designed and built the equipment, and the Stearns-Roger Manufacturing Company, of Denver, handled the installation.

G. T. Harley is manager of the potash operations; C. A. Arend, Jr., is assistant manager, and M. W. Kartchner is mine superintendent.



ABOVE—Head end of the 30-in. belt conveyor. One of the control panels is shown at the right.

RIGHT—View looking up the slope shows the belt being vulcanized. Supply track to the left.



BASIC TRENDS IN CONVEYOR APPLICATION

"BIGGEST DEVELOPMENT of all (in industry) since the war is the increased awareness that materials handling equipment offers about the last chance for cost reduction over which management

could exercise any control." That thought is expressed by R. C. Sollenberger, executive vice president of the Conveyor Equipment Manufacturers Association.

He further indicates that there has

been a strong trend during the post-war years toward automatic controls, built-in safety features, and completely integrated systems which may include many conveyors totaling several miles in length.

His contention is borne out by the manufacturers of materials handling equipment, and voiced by Steve Jessop of the Jervis B. Webb Company, manufacturers of overhead and in- or under-floor conveyor systems. Mr. Jessop crystallized these tenets in a talk he recently gave before the Conveyor Equipment Manufacturers Association, when he expressed his ideas in the following manner:

Now a Part of Production

Many conveyors of the overhead or in- or under-floor type have changed from transportation conveyors, merely moving the material from one place to another and acting between load and unload points as a storage bank, to process conveyors combining the carrying of material with the carrying through timed processes such as painting, drying off, inspection, packing or shipping and assembly points.

These material handling conveyors then become an active timed part of the production machine.

Production in most plants is governed by:

1. Production requirements tied to sales (more sales or less sales).
2. Production requirements tied to union work contracts and standards, which are producing an even higher lever on the cost of labor and the demand for less physical labor per man.

And of late, a third factor,

3. Production tied to government limits or regulations.

As a result of these production requirements, it is necessary to make conveyors or material handling equipment variable in speed over rather wide ranges and the speed must remain constant at the level selected. The variable requirement produces:

1. Tremendous goods in process variation.
2. A point to point transfer variable.
3. Many varied operations, each with its variable processing time requirement. It has demanded many conveyors integrated into a complete handling system. Often this requires the use of much existing equipment combined with new equipment. The variables become so great in systems like this that a method of synchronizing or maintaining fixed speed ratios is a necessity.



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Personnel appraisal plan adopted by Convair

CONSOLIDATED Vultee Aircraft Corp., San Diego, has initiated a plan to systematically appraise, counsel, and train executives for more important positions in its general office and manufacturing divisions. Convair's definition of executive positions begins with the factory superintendent, ends with the company president, and embraces all intermediate line and staff positions.

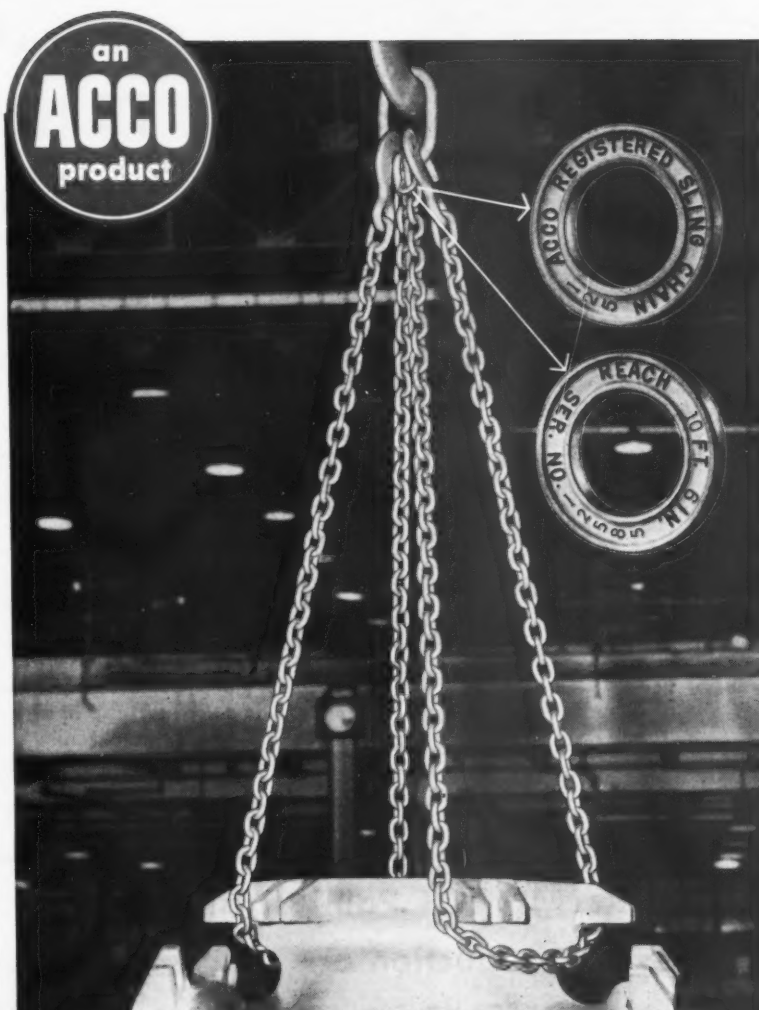
Executive development plan is comprised of five major phases: an inventory of executive personnel; an analysis of executive positions; a comparison of executive personnel and positions; preparation for training candidates; and the actual training of candidates. Training will include, but not necessarily be confined to, on-the-job coaching, in-plant and inter-plant job rotations, in-plant training, university study, research, and correspondence courses.

Responsibility for implementing plan on a corporation level rests in a master personnel committee composed of R. H. Biron, vice president as chairman, A. P. Fontaine, vice president and general manager; J. V. Naish, vice president; and H. B. Rountree, committee secretary. Program will function under comparable committees in company's operating divisions, with division managers as chairmen.

"HANDY PANELS"



SMALL SIZES, EASIER HANDLING. West coast plywood manufacturers have gone into volume production of small sizes of Douglas fir plywood called Handy Panels. New stock sizes will mean easier handling, trouble-free production lines, elimination of waste in hundreds of wood-working plants and other industrial operations using plywood. Photo shows sign manufacturing firm's storage area, a typical operation in which new small sizes will prove beneficial.



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Truck-dumping equipment (left) slides chips into an unloading pit at Longview Fibre Co., Longview, Wash.

Survey of methods for TRANSPORTING WOOD CHIPS

HERE IS THE EXPERIENCE of ten Western firms who handle wood chips. These firms are identified by number only.

Q. What unloading methods do you employ? Give details.

1. Chips are delivered to our mill by truck and by truck and trailer. The motor trucks are of 3, 4 and 5 unit capacity. The tractors and trailers have a capacity of 10 units. The trucks are of the self-dumping type. The trailers, containing 10 units, are

SAWMILLS AND PLYWOOD PLANTS are rapidly increasing their installations of wood chipping equipment, to produce and sell chips for pulping to plants a hundred or more miles away in some cases. Chip transportation and unloading (particularly the latter) at destination, from box cars, barges, trucks, or trailers, is an important materials handling factor for these mills and plants.

Since many of these plants have had little or no experience in chip transportation and unloading, *Western Industry* ran a survey among some of the plants who do have a basis of experience, with the idea in mind of providing information for all concerned and offering the experience of operating firms to benefit those who do not have that experience.

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PITTSBURGH PLATE GLASS COMPANY

dumped by means of a monorail hoist. The trailer is backed up to the receiving hopper into a position where two short pieces of shafting, approximately 3 in. in diameter and welded onto the rear of the trailer bed, are centered over half bearings mounted on a beam at the edge of the hopper. A multiple shift block mounted on a monorail above the front end of the trailer is then lowered, and a hook on the block engages a yolk fastened to the front end of the trailer, the trailer is elevated through an arc of approximately 45 degs. and the chips flow by gravity into the hopper. These trailers are approximately 35 ft. long with 8 ft. bed and sides approximately 7 ft. high.

Three at a Time

2. We unload our chips from scows and barges. The scows range from 165 to 550 units in capacity and the barges from 1000 to 1200 units (unit = 200 cubic foot measurement). The unloading is done by means of a 12-in. flexible metal pipe guided manually to the chips, the pipe being connected to a Roots-Connersville vacuum pump. The pump is driven by a 250 hp motor. A vacuum of 10 in. (Hg) is maintained as the pump. The distance from the vacuum pump to the chips is about 300 ft. The vertical lift is about 110 ft.

We have three of these systems and unload three vessels simultaneously, one system to each vessel.

3. We are currently engaged in studying the possibilities of purchasing redwood chips for use in our plant in Northern California, but we are not yet actively purchasing chips except for a few experimental cars. From the present outlook it is quite probable that we will go ahead with the project, which will include the installation of unloading facilities. We anticipate that most of the chips will be received by rail, but we will also receive a few by truck. The character of our unloading facilities will depend mainly upon the type of railroad cars which we are able to obtain and the anticipated volume of chips which we might expect to receive, but we are inclined to favor a dumping type of unloading arrangement rather than the suction which is sometimes used.

Loaders for Short Hauls

4. One item that may apply is our method of transporting chips to and from our outside storage pile. We have a Hough Payloader equipped with a 4½-yd. scoop bucket and we haul to and from a large storage pile, making a round trip of about 1800 ft. This machine has 14 in. by 24 in. tires, 4-wheel drive, hydraulic steering and scoop positioning, top speed of 20 mph, and

will climb a 20 per cent grade. In hauling to storage, a runway is built with chips and the scoop climbs this and dumps on the pile.

5. We unload the pulp chips directly from bottom opening gondola rail cars into a pit. The chips are then taken out of this pit by chain conveyor.

6. We use an under-the-car hopper, and convey the chips to storage by means of a flight conveyor. The cars are side-opening converted box cars.

7. We receive chips shipped by car as well as by truck. The chips which we receive by rail car are unloaded by hand, the chips flowing by chute onto a conveyor that carries the chips direct to the digesters. The chips which are delivered by truck are unloaded directly onto the conveyors which transfer the chips onto the screens, from the screens into the storage bin, and from there to the digesters.

Rake for Agitation

8. The majority of our chips arrive at our mill in converted 50-ft. over-age automobile box cars, or in converted 40-ft. gondola cars and by our own fleet of semi-trailers. The unloading mechanism, referred to as a rake or plow, is pulled back and forth to agitate the chips and assist in unloading through the bottom of the gondola car. The same type of rake or plow is used to unload converted 50-ft. box cars, which contain two bulkheads of three rakes, one for each compartment. In the case of box cars, the rakes are pulled from side to side of car within each compartment, while in the case of gondola cars, the rakes are pulled from end to end of car.

9. We unload by hand. The box cars have two side gates on each side of the car. These gates are raised, allowing chips to fall out of the car into a hopper for bucket elevator. Bucket elevator delivers chips onto belt going to woodfiber plant. Car is emptied out by one man with pitch folk. This method is not very satisfactory, but the small volume of these chips does not warrant heavy investment for mechanical unloading.

Pacific Coast Method

10. Wherever possible, we transport our chips by railway, but in some cases where the mill is located off the railroad, it will be necessary to use a truck. The practice of hauling by truck is being done on the Pacific Coast and with a great deal of success. The equipment consists of a 10-unit semi-trailer with a capacity of 10 units, or 40,000 lbs. min. The frame is made of H-tensile channel and the sides of waterproof plywood. It is 35 ft. long, 8 ft.

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high and 8 ft. wide, and can be pulled by any make of heavy truck. When dumping, the truck can be disconnected from the trailer, a hook and cable fastened to the trailer, and then raised up endwise allowing the chips to slide out at the end into an unloading pit.

Q. What are the advantages of your unloading systems?

1. The system is fast, inexpensive and practically foolproof.
2. It is the only practical method we have so far devised or become acquainted with.
5. The advantages of this system are small initial expenditure and economy of labor in unloading the cars.
6. Economy is power, as compared with the vacuum system.
7. The car unloading is rather expensive, but due to our space, unloading by hand is about the only way we can get the chips from the cars into the chutes. It is not too desirable, but we have increased our efficiency and operation as time goes on. The unloading by truck is without cost to the company, as the trucks back into the unloading bin where they are raised to a loading position and the unloading is done automatically.

8. It requires approximately 10 minutes to unload one trailer (which contains 10 units) and approximately 40 minutes to unload a rail car (20 units). These times are the total elapsed time including placing the rail car over the unloading pit and removing the chips and returning the car to its previous position, and from the time the semi-trailer reaches the unloading ramp, is hoisted, chips dumped, lowered and connected to the tractor. We believe the greatest advantage of this method is the speed in which we can unload both semi-trailers and railroad cars.

10. In our particular operation it is both essential and necessary that our chips be kept clean at all times, and that they be free of any foreign matter such as cinders, dirt and other undesirable particles. For this reason we request that our suppliers place our material in closed box cars for shipment. This can be done by using a conventional blower, piped from the vibrating screen to the car. In this type of setup we seal up one door of the car completely and board up the second one also, leaving two openings large enough for the blow pipe to enter the car. With this type of blower it is also necessary to pipe the dust and surplus air back out of the car, into the system

again. This type of equipment is satisfactory, but due to the physical design the chips have to pass through the fan which causes some of the material to be broken up smaller than is desirable for chips.

We have found that the "Convey-air" unit, which is designed on a charger principle, does a better job than any conventional blower for several reasons:

- a) The chips do not pass through the fan at any time, but are blown directly from the auger infeed to the car.
- b) It requires 4 in. or 5 in. pipe from screen to car, depending on size of the unit, making it much easier to hang the pipe.
- c) There is no dust associated with the operation which eliminates the necessity of piping the surplus air back out of the car.
- d) Elimination of the dust problem makes it much easier to load.
- e) We find it is possible to blow material as far as 600 ft. with a single unit.
- f) It takes less power to operate, requiring a 25 hp motor on the blower and a 5 hp motor on the infeed auger.

Q. What are its disadvantages?

1. Since we have been receiving chips in this manner, the system has developed no serious disadvantages.
2. High power cost is the principal disadvantage, but this is by far offset by the maintenance cost, cost of attendance, and space required by other systems proposed.
5. The main disadvantage is the length of time required to unload each car, this being approximately one hour.
6. The amount of hand work necessary to loosen the packed chips before they can be pulled out of the car by the mechanical rakes in the bottom of the car.
8. It is difficult for us to specifically say that there are any disadvantages to the method of unloading these cars or the trailers.
9. Too much labor, unloading by hand.

Q. Any cost figures, if you care to give them.

1. If this refers to the cost of unloading chips at the mill, these costs are negligible. If the question refers to transportation cost, such costs depend on the length of the haul and are subject to regulations of the Public Service Commission.



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Better Temperature Control—and extra years of dependable service are assured by: 1) Easy to read 4" dial thermometer shows temperature of liquid or air being controlled, makes it easy to adjust regulator for proper temperature. 2) Has valve stem lubricator. 3) OVER-heat protection. 4) Temperature adjustment has OILITE thrust bearing.

Available also without dial thermometer in a variety of 60° F. ranges and valve bodies 1/4" thru 8".

► **WRITE FOR BULLETIN 329 • THE POWERS REGULATOR CO. • 1808 West 8th Street**
Los Angeles 5, Calif. Offices in San Francisco and Seattle

POWERS

2. One system will unload on an average about 16 units per hour, at an operating and maintenance cost of 40 cents per unit.

5. Initial cost of the installation is approximately \$40,000, which includes a 500-ft. belt conveyor to chip storage.

7. We do not care to submit cost figures, as we do not feel it would be of any particular benefit when used accumulated with other cost information.

8. At the present time, we do not have sufficient figures to give an accurate account of unloading costs.

9. Cost per unit of chips for labor, by this method, is 80 cents per unit.

Q. What is length of the haul?

1. We receive chips from quite a few different plants in Western Washington. Length of the haul varies from less than a quarter of a mile to 120 miles. All chips originating outside our home city are hauled in 10-unit trailers.

2. About 300 ft. to 500 ft. depending upon size and location of vessel.

5. At present we are hauling chips a distance of 200 miles into our plant.

6. Longest haul is 120 miles.

7. The haul varies depending upon whether by rail or by truck. Rail haul is up to approximately 100 miles; truck haul is up to approximately 25 miles.

8. The maximum one-way haul by truck is approximately 53 miles, and the minimum, approximately 11 miles. Minimum haul via rail is 49 miles; maximum haul is approximately 185 miles.

9. The length of haul on the box cars is 15 miles. The length of scow haul approximately 80 miles.

Q. What volume is transported monthly to your mill by box cars, barges, motor trucks, trailers; in cubic feet, units of chips?

1. The average monthly volume of chips received at the mill by truck or trailer is approximately 3500 units. We have in times past received some chips in box cars, but are not receiving any at present. We do not receive any chips by barge. Approximately $\frac{1}{3}$ of the chips come in on trucks and $\frac{2}{3}$ are received in 10-unit trailers.

2. Chips are moved by scows and barges only. The monthly volume averages about 19,000 units.

5. The volume of chips received

... Concluded on page 130

A regular "busybody"

AROUND YOUR PLANT

HANDLES MATERIALS — indoors or out.

Scoops up and carries a full cubic yard at a pass — two yards with bucket for light materials such as coal. Only a crawler tractor gives you the traction, power and flotation for working under any conditions. And this A-C crawler gives you an extra, fast reverse to increase output, plus 1,000-hour lubrication of truck wheels to save you 30 minutes' greasing time every day.

STORES COAL, compacts and reclaims it.

This flexible unit builds stockpiles in any available space. Spreads and packs coal in thin, horizontal layers to eliminate spontaneous combustion. As coal is needed, the HD-5G loads from stockpile to trucks. On short hauls, it dozes or carries coal direct to plant.

CLEANS UP WASTE — loads or carries it.

Out in the yard, this busy tractor cleans up and loads industrial waste, excavates, trenches and backfills on new construction, spots cars, clears snow... handles many other jobs winter and summer.

Allis-Chalmers HD-5G

1 and 2 cu. yd. buckets. 40 drawbar hp. Dumping Height — 9 ft. $\frac{1}{4}$ in. — other models with buckets to 7 cu. yd. and up to 175 net engine hp.

Interchangeable attachments for the HD-5G include: Special buckets — up to 2 yd. . . Lift Fork (below) for handling palletized loads . . . Crane Hooks for heavy lifting . . . Bulldozers for any excavating . . . Trench Hoe for footings, pipe, other trenching



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Your Santa Fe freight man knows how to make your hard shipping jobs look easy—and how to handle your common jobs uncommonly well. Call him today—find out how easy it is to ship via Santa Fe all the way!

*E. B. Johnson, Freight Traffic Manager
Santa Fe Lines, San Francisco, Calif.*

monthly by rail car is 80 to 100 units per month.

6. Box cars, 3600 units.

7. We receive approximately 250,000 cubic ft. of chips per month by rail car, which is approximately 1,050 units. We receive currently approximately 35,000 to 50,000 cubic ft. of chips per month by motor truck, which is some 60 to 70 truck loads, or about 150 units of chips.

8. Box and gondola cars, 2,024,000 cubic ft., 10,120 units; barges, none; motor trucks, 152,600 cubic ft., 763 units; trailers, 477,600 cubic ft., 2,388 units.

National safety contest won by Wyoming mine

FOR THE FOURTH consecutive year, Reliance No. 7 mine of Union Pacific Coal Co. at Reliance, Wyo., wins the "Sentinels of Safety" trophy for underground bituminous coal mines in the 1951 safety competition conducted by Bureau of Mines, U. S. Department of the Interior. Reliance No. 7, competing against mines throughout the country, worked 464,666 man-hours last year without a lost-time injury for the nation's most outstanding record in the underground bituminous coal mine group.

Two Colorado operations awarded certificates of achievement in safety for injury-free records or for placing high in their respective groups were the Osage bituminous coal mine, an open-pit at Milner in Routt County operated by Osage Coal Co., and the Boettcher limestone quarry at LaPorte in Larimer County operated by the Ideal Cement Co. Both operations worked 30,000 or more man-hours in 1951 to be eligible for certificates.

A total of 585 mineral operations enrolled in the 1951 competition, a gain of 10 over the 1950 enrollment and 375 more than were entered in 1925, contest's first year. Man-hours of working time or exposure to accidents totaled 180,258,242 for all contestants, the greatest amount in the contest's 27-year history. Perfect safety records were reported by 158 of the 585 mines and quarries entered. These 158 operations worked a total of 18,580,609 man-hours without a disabling injury.

Safety records were much better for competing mines and quarries in 1951 than for the industry as a whole. Injury-frequency rate of 28.065 per million man-hours of exposure was lowest on record. Injury-severity rate of all contestants was 5.915 days lost per 1,000 man-hours of work, third lowest in the history of the contest.

Economical hi-lighting worked out by aviation co.

NORTH AMERICAN Aviation, Inc. of Los Angeles has conquered the task of adequately maintaining Hi Bay fluorescent lighting installation. Group replacement of lamps at approximately 70% of average rated life has cut maintenance costs 75%.

NAA's problem building, measuring 300' by 500', has a height of 30' to lower chord of the trusses. In order to efficiently utilize the building's floor area, it is impossible to lay out machinery, work benches, and other working areas in a manner permitting free access to overhead lighting fixtures. Plan worked out to service fixtures consists of a cableway suspended along either side of each row of fixtures. On every cable is a carriage easily moved along as required. Installed cost of this system was about \$3,200. The entire amount was saved in one complete relamping and cleaning.

It should be pointed out that the too-common practice of squeezing the last drop of "juice" out of light bulbs and tubes does not pay. North American uses a simple method of determining the time of group replacement. Starting with all new lamps, they keep a 10% surplus of those in use to replace those that burn out. The economical point at which to replace the whole group comes when the 10% is used up.

Chemical research fellowship sponsored by Hooker

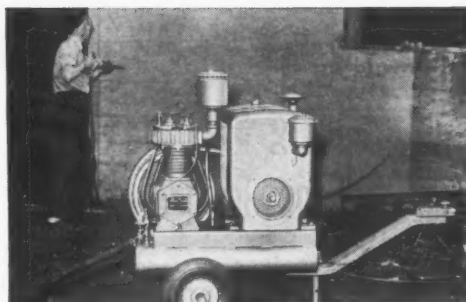
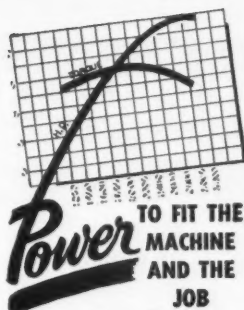
A RESEARCH fellowship in chemical engineering at the University of Washington is being sponsored by Hooker Electrochemical Co.

According to word received from that firm, research will be concerned with uses of caustic soda and chlorine as related to use of waste products of the pulp industry such as lignin.

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WISCONSIN-POWERED Gardner-Denver Compressor

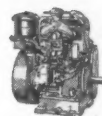
This Model TP04931E Portable Compressor, made by Gardner-Denver Co., Quincy, Ill., is supplying air for the operation of a Model S17 Utility Drill, engaged in a plant maintenance job. Complete power reliance is placed on the Model TF 2-cylinder Wisconsin Heavy-Duty Air-Cooled Engine.

More and more builders of engine-driven equipment are discovering, to the satisfaction of themselves and their customers, that you can't do better than to specify "Wisconsin Engines"... for dependable power to fit both the machine and the job.

Available in a complete power range from 3 to 30 hp., in 4-cycle single cylinder, 2-cylinder and V-type 4-cylinder models, Wisconsin Air-Cooled Engines provide economical power, without waste, to meet the most exacting requirements. Look into them for your use.



4-cycle
Single Cyl.
3 to 9 hp.



4-cycle
2-Cyl.
7 to 13 hp.



V-type
4-Cyl.
15 to 30 hp.



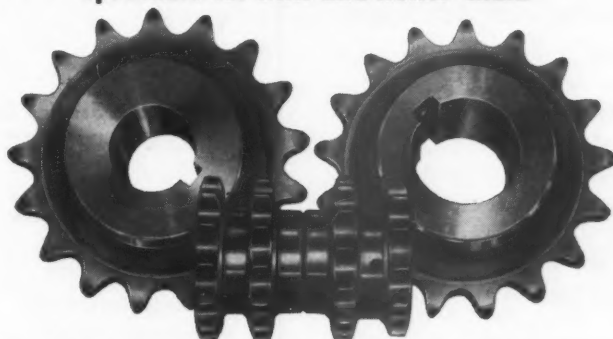
WISCONSIN MOTOR CORPORATION

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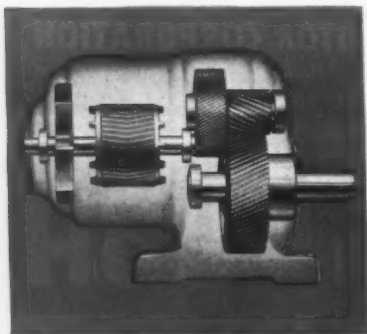
Benicia, Calif. Phone 628

Stockton Iron Works • Stockton 7-7091

7 Years of Outstanding Service Reported for Slo-Speed

Slo-Speeds have given outstanding service on casting tumblers which place rapidly alternating and opposing heavy loads on the gears. Slo-Speeds also operate in the presence of fine sand and iron dust and in spite of this unusual abuse, Slo-Speeds have been in operation 5 days per week since 1944 with no attention except lubrication, reports H. L. Romine, Foundry Engineer, Renfrow Gray Iron Foundry, Los Angeles.

STERLING SLO-SPEED



OUTSTANDING FEATURES:

Simplified gear system — balanced design — compact — rugged — highly efficient — abundant lubrication — low output shaft — positive oil seals — Herringbone Rotor — protected — streamlined — direct through ventilation — quiet operation — AGMA speeds — extremely long life — every unit will operate in any position.

70 ILLUSTRATIONS showing how Sterling Electric Power Drives reduce production costs. Write for Bulletin No. C-131.

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Plants: New York City 51; Van Wert, Ohio;
Los Angeles 22; Hamilton, Canada; Santiago, Chile
Offices and distributors in all principal cities

HELPFUL LITERATURE

for the plant operator who wants to keep informed

801

"Bull's-Eye" lamp highlighted

Lighting advantages and construction features of *Lindly & Co.*'s "Bull's-Eye" lamp are contained in an illustrated brochure from that firm. A must for those concerned with close work and assembly operations in industry.

802

"It's Pal-O-Matic Time"

This is the title of a new catalog published and distributed by *Roll-Rite Corp.*, which lists special features and operating methods of its Pal-O-Matic drum handling equipment. Many photographs and drawings illustrate drum handling applications.

803

"How to Take Part in Defense Work"

Purpose of a valuable booklet, released by *Chrysler Corp.*, is to assist those companies who are seeking defense work as suppliers to prime contractors.

Literature tells how Chrysler goes about finding suppliers for its defense assignments and outlines some steps that should be taken by those desiring this type of contract.

804

About making smokeless fuel or coke in stills

Stilcok Co. makes available Bulletin II, which describes apparatus, process and plant layout for distillation of carbonaceous materials at this company's plant. Solution to problem of distillation of these products is urgently needed as a national oil and gas conservation measure.

805

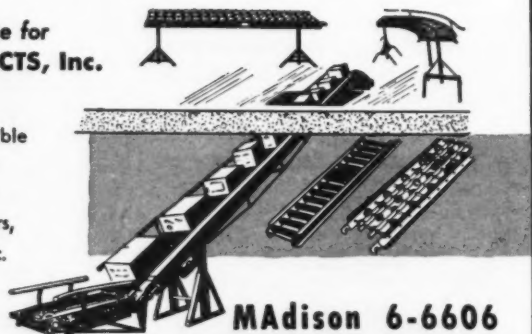
How to finish Western pine paneling

"Installing and Coloring Your Walls of Western Pines and Associated Woods" is published by *Western Pine Association*. This 16-page publication provides exact instructions for installing and coloring.

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Sales & Service for
ARROW PRODUCTS, Inc.

Permanent and Portable
Belt Conveyors
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**MATERIAL HANDLING
EQUIPMENT**

ling paneling in new construction or over plaster or masonry walls. It lists a variety of finishes that may be prepared at home, together with instructions for mixing and contains a long list of prepared finishes.

806

Helpful information for V-drive users

Users of V-drives will find the 44-page *Maurey Manufacturing Corp.'s* V-drive catalog a useful and convenient source of buying information on fractional hp. V-drives and drive parts and accessories.

807

All about gravity conveyors

A 28-page, two-color catalog, published by *Lamson Corp.*, lists size and specification data on a full line of roller gravity conveyors. Detailed construction characteristics as well as a number of application descriptions are included.

808

Tips on chassis marking

"Any Questions on Chassis Marking" is title of an informative leaflet on *Jas. H. Matthews & Co.'s* precision stencils which are used in electronic, plastic, metalworking, metal stamping, automotive, aviation and other industries. Engineering assembly details, codings, and other processes are outlined.

809

"A Few Facts About Dehumidification for Industry"

A bulletin containing information on dehumidification, written from the standpoint of manufacturers, is available from *Abbeon Supply Co.* Subject is defined and the problems it causes discussed.

810

Electrical fittings bulletin

A complete line of solderless wire connectors, cable and conduit fittings and wiring devices is fully detailed in a literature piece produced by *Buchanan Electrical Products Corp.* Text is illustrated with many photographs and drawings.

811

Silicone lubricant data sheet

Facts about *Dow Corning Corp.'s* special purpose silicone lubricant, Valve Seal A, are available in a data sheet issued from that firm. Tables evaluating the performance of Seal A in over 120 different chemical and gas services are included.

812

Government tape specifications

Two dozen "Scotch" brand pressure-sensitive tapes that meet various

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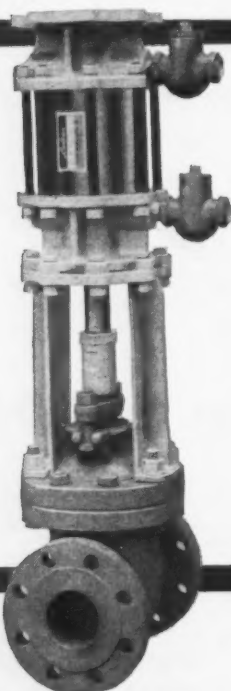
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Ledeen VALVE ACTUATORS



for POWER OPERATION and REMOTE CONTROL of Line Valves

If you require automatic controls or power operation—or if your plant uses many valves in remote or inaccessible spots, you can save manpower and simplify your operations by installing Ledeen Valves. Adaptable to most any make, size and type of valve to operate against any line pressure, for any fluid medium, with any pressure. Positive, rugged, economical.

Write for Bulletin 512

VALVES • CYLINDERS
AIR-HYDRAULIC PUMPS & BOOSTERS
VALVE ACTUATORS • AIR HOISTS

Ledeen Mfg. Co.

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government requirements are highlighted in a 16-page manual issued by *Minnesota Mining and Manufacturing Co.* Handbook contains 42 photographs and illustrations and gives complete data on tapes for packaging, holding, mending, masking, sealing, mounting, protecting and splicing jobs.

813

Materials handling bulletin

A survey of *Ira G. Perin Co.*'s stock of materials handling equipment is available in a new catalog published by that company. Catalog is divided into equipment sections.

814

Learn about Lyon Metals

A comprehensive 20-page brochure, issued by *Lyon Metal Products, Inc.*, tells complete story of Lyon's facilities and gives reasons why company is geared to handle sheet metal contracts so effectively. Send for "Craftsmen in Sheet Metal."

815

148 pages about chain engineering

Engineering data book No. 2457, just released by *Link-Belt Co.*, gives engineers 148 pages of comprehensive information on roller chain and its applications. Book covers selection, in-

stallation, lubrication and maintenance of roller chain for drives and conveyors, and sprocket wheels. Design notes and selection data serve as a practical textbook on use of roller chain for both power transmission and conveying operations. Formulas, charts, diagrams and typical problems simplify selection.

816

"Instruments Accelerate Research" re-issued

Minneapolis-Honeywell Regulator Co. has just re-issued Bulletin 15-14, "Instruments Accelerate Research." It has been revised to include many items not covered in previous edition and has been brought up to date to include the latest designs of various analytical equipment. Bulletin now comprises 96 pages and has complete illustrations with pictures of the latest instruments and equipment in the laboratory, analytical and measurement fields.

817

Industrial nozzle bulletin

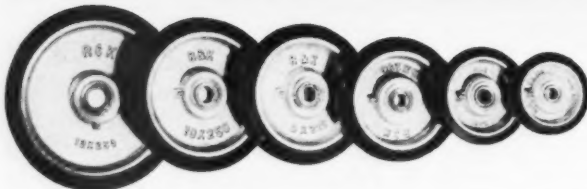
Anyone responsible for the specification of spray nozzles for metal cleaning, bonderizing, spray quenching, gas washing, or similar industrial applications will find a wealth of information in a new 40-page industrial nozzle bul-

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Genuine R & K wheels are made only in the West. All manufacturing operations, from sand cast wheels to the finished product, are done in our own plant to assure you finest workmanship and consistent high quality at the lowest possible cost. Insist on R & K industrial wheels . . . the standard of quality.

Note to Dealers:

Attractive dealerships are available in select territories (on non-exclusive basis). Write us on your business letterhead for further details.

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letin just published by *Binks Manufacturing Co.* Bulletin 5200 has a handy index that lists 29 different applications for industrial spray nozzles with page references for each. All nozzles are illustrated and in many cases cut-away drawings showing construction and operation are included.

818

Columbia "best sellers"

Columbia Engineering Service Co. is offering our readers literature on the following subjects: magnetic pulleys, magnetic plate, magnetic sweepers, magnetic ducts and magnetic traps.

819

Learn how return sludge is automatically controlled

An application engineering data sheet, published by *The Foxboro Co.*, describes how modern instrumentation controls air and return sludge, using this company's automatic control system. Control details and a complete description of the process are contained in AED 833-9.

820

Wall chart for surface roughness measurements

Micrometrical Manufacturing Co. makes available a two-color wall chart which lists working range of Profilometer equipment for measuring surface roughness in microinches. Chart gives a tabular listing of seven standard tracers, types and dimensions of internal and external surfaces that can be measured with each tracer, and types of piloting used. Also includes recommendations on use of manual tracing. Illustrations show typical applications of various tracers.

821

How to eliminate industrial dermatitis

"The Answer to Industrial Dermatitis Is Just As Simple As This," is title of a six-page catalog and price list of "Skin-Cote," a water soluble barrier cream for protection from industrial skin irritations. Booklet contains comprehensive chart of chemicals and processes and type of "Skin-Cote" recommended for each. Available from *The Boyer-Campbell Co.*

822

Helpful information for the metal working industry

A booklet, available from *Turco Products, Inc.*, outlines most of the chemical processing operations that are necessary in the metal working industry and describes tested and proved Turco-manufactured compounds that suit each operation. A group of useful charts is included.

THE CHAIN-VEYOR

NOW ... for the first time at a low cost
— a light capacity, fully enclosed, continuous power driven conveyor.

Engineered, developed, and tested over a period of years, Chain-Veyor eliminates complicated, fast-wearing parts—providing dependable, economical operation demanded by modern production.

FEATURES:

VARI SPEED UNIT

Positive sprocket tooth drive with easily replaced shear pin protection. Chain stresses distributed over a wide area to give a straight line pull.

TRACK

1½" x ½" slotted steel tubing—easily installed with minimum support.

CHAIN

Vertical load wheels and horizontal guide wheels, on greasepacked ball bearings, are mounted on steel side links with bronze universal joints at 3" intervals.

CURVES

Design permits curves with 15" radii. Any combination of vertical or horizontal curves can be obtained.

TAKE-UP

Unique type of adjustable spring take-up automatically maintains uniform chain tension, compensating for linear expansion and contraction up to 12".

CAPACITY

Carries loads up to 30# per pendant at 6" intervals. 60# loads may be carried at 12" intervals supported by 2 pendants fitted with cross bar attachments.



ENGINEERING SERVICES

Let our Engineering Department, experienced in design, installation and maintenance of all types of conveyors, consult with you, without obligation, regarding your conveyor problems. WRITE NOW!

NOTE:

If in the vicinity, drop in and see our 320 foot test installation. It has 8—180°, 14—45°, 5—90° curves, all driven by a single ½ hp drive, operating under the most adverse conditions to which any conveyor system could be subjected.

Another quality product by the manufacturers of U.S. Highway Guard, U.S. Silver Line Farm Tools, Silver Line Brake Lining and Original Equipment for the automotive industry for over 35 years.



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NEW MATERIALS & EQUIPMENT

COUPON ON PAGE 133
provides an easy way to
obtain more information
on products introduced.



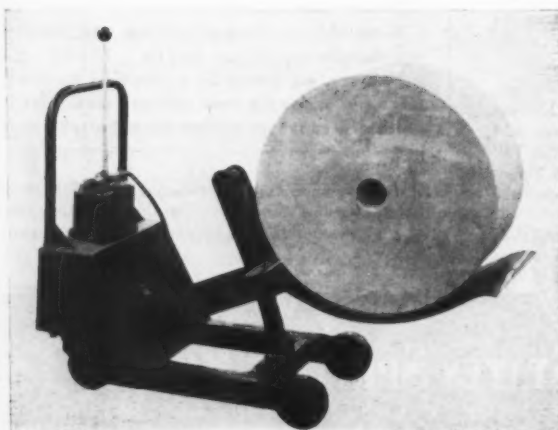
824—For small spray jobs

This spray gun is designed for small refinishing jobs, stenciling, blending, high-lighting and decorative work. Its spray pattern is medium sized and can be adjusted to practically pin-point size for touch-up work. Gun body has aluminum die casting, which permits use of wide range of materials including latex. It is lightweight and can be used with standard glass jar fluid containers. Trigger, which actuates both air valve and fluid needle is designed for either right or left hand. Made by *DeVilbiss Co.*



825—New thread-cutting screw

A thread-cutting screw, designed by *Shakeproof, Inc.*, is ideal for molding into rubber because the enlarged surface of its pancake head provides holding power. Hexagon feature prevents screw from turning. Screw has thread-cutting slot and spaced threads that permit free cutting in plastics of all kinds without chipping or breaking. One current application for this screw is its inclusion in rubber suction cups. After molding, cups are fastened by means of screw to plastic tray bottoms, dishes, containers, etc.

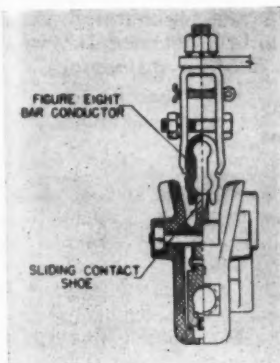


826—Lifter speeds roll handling

A new lifter designed by *Service Caster & Truck Corp.*, will load and unload rolls of paper, cloth, aluminum, leather, and rubber belting, weighing up to 1,000 lb., from presses, looms and other roll fed machinery. It protects rolls of expensive materials from being damaged, speeds up roll changing and handling, and enables one man to do the job. Overhead cranes and slings not necessary. Custom built to individual requirements. For horizontal movement, lifter is mounted on unbreakable steel casters, two rigid and two swivel for easy steering.

827 Mobile trolley system for electrification of cranes

Available in capacities of 50 to 300 amps is a rugged, mobile trolley system for safety electrification of cranes and hoists. It can be installed or changed without disrupting plant production. It is adapted to curves, switches, turntables, transfers, and spur runs. System consists of two basic units: (1) an insulator sheath that snaps over the eight-bar conductor, and (2) a sliding shoe collector that is held in position by adjustable spring action. Sliding shoes make contact with conductor through a continuous, narrow opening at bottom of insulator sheath. Initial and maintenance costs are low. Available from: *Benbow Manufacturing Co.*

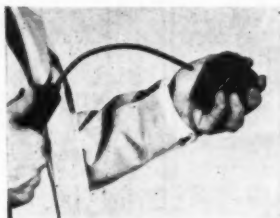


828 Lifts twelve at a time

This box-liftstacker, distributed by *R. D. Adams Co.*, will pick up six boxes of fruit and stack these six on top of another six, thereby enabling warehouse men to have a stack twelve high. Present model handles boxes 20 x 12 x 11 in.; other sizes by special order up to 36 in. in length. Unit can be used with one or two 6-volt batteries. Use of this box-liftstacker eliminates on the average of three men in each warehouse.

829 Special industrial light speeds inspection and machine work

This light has a bright beam for directing at a cavity or crevice to speed inspection, grinding, machining and other precision work. Because light and vision are improved, flaws can often be detected earlier, saving disassembly and rejection at end of line. Different attachments to direct light are made to specially fit individual needs.



Price is only \$20.00. Available from *Eder Instrument Co.*

830 Plug-in power and light device

Rolla-Duct is the first plug-in power and light device with more than three taps that has received Underwriters' Laboratories approval. It comes with 21-ft. of rugged, 12/3, chemical, acid and grease resistant cable. Electrically safe, and approved for 20-ampere loads of 115-volt operation,

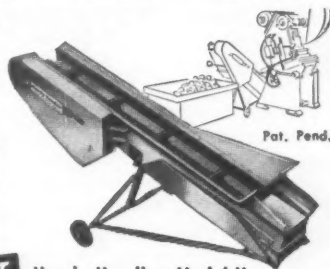
Big MAN-HOUR Savings

with Belt portable handling equipment, built especially for a variety of industrial jobs!

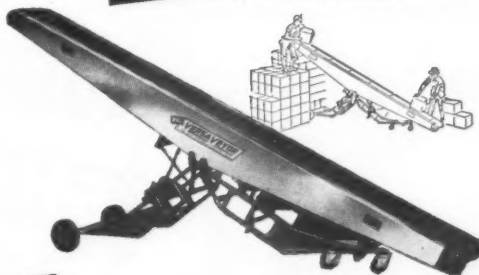
Stop your material-handling profit leaks by using lightweight, portable and inexpensive Belt conveyor equipment. Reduce the time and cost of scoop-shovel jobs, stacking and storing, loading and unloading packaged goods and bulk materials.

WRITE TODAY FOR PRICES AND LITERATURE!

Lengths—6, 8 or 10 ft. • height of undercarriage easily adjustable • will handle 100 lb. distributed load, 25 lb. maximum unit load • aircraft-quality, aluminum-alloy frame construction • 50 f.p.m. chain speed.



BELT Handy-Handler, Model U



BELT Versaveyor, Bag and Box Handler

Overall lengths—13, 15, 17 or 19 ft. • 18-in. bed • can be operated with or without either or both undercarriages • 60 f.p.m. belt speed • aluminum-alloy frame • 600 lb. distributed load • 150 lb. unit load.



BELT

Model S Handy-Handler

Standard 16-ft. length; also has 4-ft. extension section (special lengths available) • tough, aluminum-alloy construction • weighs 97 lbs. without the easily detachable power unit • can be used with or without dolly.

Pat. Pend.

MANUFACTURED BY THE BELT CORPORATION, ORIENT, OHIO

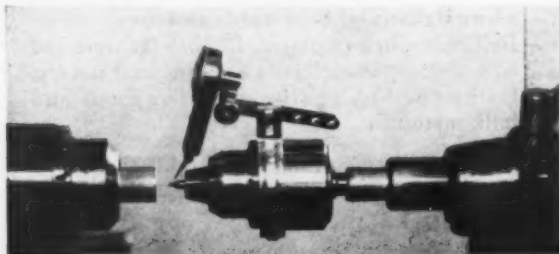
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Rolla-Duct is fully grounded and protected with a circuit breaker incorporated in the strip. Its development assures greater safety in use of portable, electrical service, eliminating makeshift drag cords and extensions from wiring, particularly in the field of portable lighting. Available from *National Electric Products Corp.*

831

Indicator holder for controlling center depths



This tool was developed when the inventor had to process several shafts with five diameters and shoulders to hold to a plus .001 minus .000 over all. He had very good success and no ruined parts by controlling center depths with this indicator holder. It is possible to scratch the end of your shaft with this set-up.

This same setup can also be used to control depth of holes drilled in a lathe. Degree of accuracy is determined by the graduations of the indicator, i.e., .0001, .0005, or

.001, as the operator can easily stop on the same position of the indicator every time. Chips should be kept clear with a light air stream while drilling. If drill or center drill becomes broken during operation, a new one can be replaced and set up by putting a previously drilled or centered shaft in lathe chuck and setting new tool to it and adjusting indicator to zero as before. Turn lathe backwards slowly to check. The same accuracy can be maintained. Developed by and available from *Monte E. Hover Engineering Co.*

832

Accomplishes all pre-paint jobs in one operation

Oakite Compound No. 31 cleans, derusts and phosphates in a single operation. This useful product, available from *Oakite Products, Inc.*, is a highly concentrated liquid detergent which can be diluted up to 25% by volume for economical pre-paint treatment of metal by dipping or hand-swabbing methods. It produces an etching and conditioning action on aluminum sheet and aluminum castings which greatly improves paint to metal adhesion.

833

Synthetic rubber and glass fiber makes excellent waterproofing

"Nerva-Clad" is a roll sheeting waterproofer consisting of an engineered membrane built around a woven spun glass ply, ready for installation in one operation. Component parts—spun glass, synthetic rubber and asphaltic hydrocarbons—are outstanding for their resistance to

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SHOPLIFTER

for safe one man operation in moving heavy dies, or other material handling. Automatic brake holds load at any height.

500 lb. capacity Type D, hand operated
1000 lb. capacity Type DX, hand operated
2000 lb. capacity Type DX, hand operated

Floor lock to hold machine steady.

HI-REACH TELESCOPER Model-PUL

for safe servicing of overhead maintenance jobs. When telescoped down to 6'8" high by 32" wide, can be rolled through doorways and narrow shop aisles.

THREE STANDARD MODELS

- No. 1 Platform lift 10'9"
- No. 2 Platform lift 11'9"
- No. 3 Platform lift 15'0"

Equipped with 5" dia. base wheels. Other Hi-Reach telescopers available up to 60' or more.



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moisture, oxidation, corrosion and climatic changes. Offers very adequate protection for structural steel, reinforced concrete, tanks, tunnels and pipelines. A product of *Rubber & Plastics Compound Co., Inc.*

834

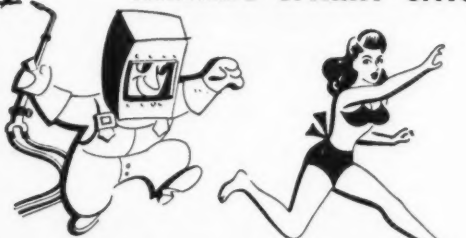
Light capacity overhead conveyor is low in cost

This light capacity, power-driven, overhead chain conveyor, the Chainveyor, is not only engineered for dependable, long-time operation, but is low in cost, since complicated and fast-wearing parts have been eliminated. Its short radius curves and track sections are easily combined for quick changes or additions. It handles loads up to 30 lb. on each pendant spaced at six-in. intervals or 60-lb. loads at 12-in. intervals. Varispeed drive permits instant speed adjustment. Track is $1\frac{5}{8}$ x $\frac{1}{8}$ in. slotted tubing which requires minimum support and results in drastic reduction of track weight for a given load. Drive chain is revolutionary in design: Bronze universal joints are spaced at three-in. intervals to assure equal wheel loading, regardless of direction of chain pull. Load wheels are vertical with intermediate horizontal guide wheels. All wheels are mounted on grease packed ball bearings. Available from *U. S. Spring & Bumper Co.*



Available from *U. S. Spring & Bumper Co.*

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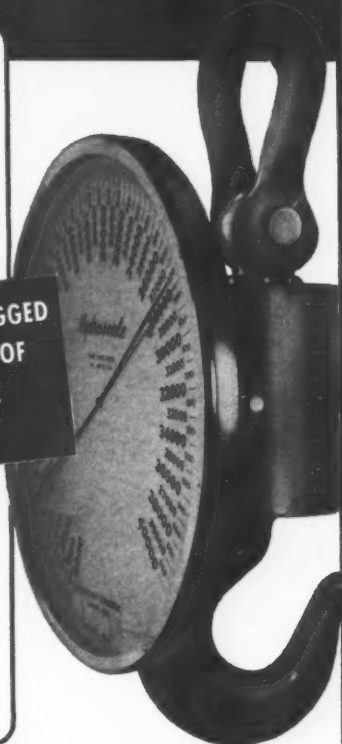
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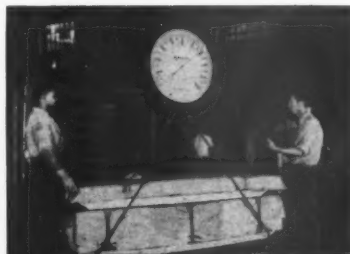
- 12", 24" and 30" dials
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Protects you against loss by making weighing easy and effortless. Encourages careful checking of materials in and out of plant and materials in process at production stages. Repeat orders from users in all types of industry testify to its usefulness and versatility.

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No. 4P, 2½" to 4" pipe

Extra easy to carry and put on pipe

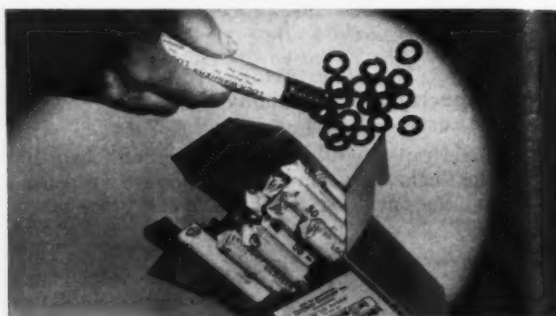
- ★ Balanced loop handles—easy to swing 4P where you want it.
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- ★ Buy efficient 4P at your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO



835

Lock washers packed by "bankers" methods



A new method of packaging lock washers—in coin rolls—is developed by *The Mellows Co.* When washers are placed in these paper tubes, counting and weighing of smaller sizes of lock washers are eliminated. A unit of sales is established because user can buy washers already wrapped in small lots of 50 to 1,000. Washers are packed in most compact form possible and occupy less shelf space. Small quantities do not have to be wrapped, and handling time and expense are reduced.

836

New alloy makes exceptional switches

Precision miniature switches that will close as many as 100,000,000 times are now possible by use of a new alloy made by *Armco Steel Corp.*, known as Armco 17-7 PH (precipitation hardening) stainless steel. Operating clearances in these switches are often critically small, and even a slight



U. S. Patent No. 2,477,855

- ✓ For joining grader, trencher, ditcher and other earth moving conveyor belts.
- ✓ For belts ⅜" to ½" thick.
- ✓ A FLEXCO fastener that is HINGED. Has removable hinge pin.
- ✓ Troughs naturally, operates through take-up pulleys.
- ✓ Strong, durable . . . pull or tension is distributed uniformly across joint.

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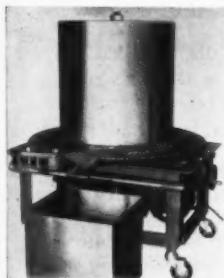
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change in position of actuator may make them useless. Drift characteristics of 17-7 PH stainless are superior to any other material tested. Switch life has also been greatly lengthened because of exceptional flexure endurance of metal. Another advantage is marked corrosion resistance, which contributes to long, dependable service. Switches available from *Micro Switch Division of Minneapolis-Honeywell Regulator Co.*

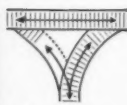
837

Feeder offers steady, well-balanced production diet

Com-Bin feeder, manufactured by *Pulva Corp.*, will feed uniformly almost any sticky or plastic material, and accuracy from minute to minute will not vary more than 2%. Feeder consists of a cylindrical shell, mounted concentrically on a rotating vertical shaft by means of spider arms. Below cylinder, mounted on same shaft, is a circular plate, larger in diameter than cylinder. There is a gap between plate and bottom of cylinder. As cylinder and plate rotate, stationary plow which extends through gap continuously removes a stream of material from bottom of mass in cylinder, discharging it off the edge of plate.



3 WAY "FLEX-A-SWITCH"



"LINE-Y" ADAPTATION

Flexible midrib and segmented side rails keep axles concentric at any setting to assure positive line of travel without guard rails. Can be used with curves and straight sections to distribute work in production or warehouse handling.

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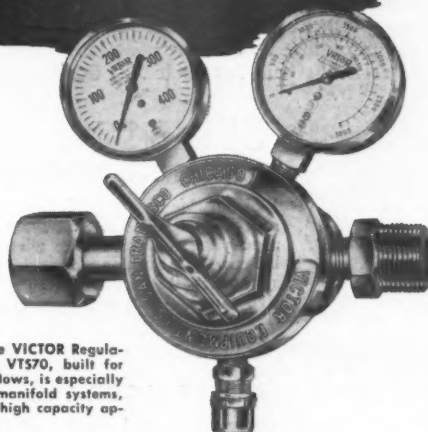
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Big 2-stage VICTOR Regulator Model VT570, built for large gas flows, is especially suited to manifold systems, and other high capacity applications.

ACCURATE OPERATING PRESSURES—Setting holds over entire pressure range, regardless of inlet drop, thus keeps welding or cutting flame steady without readjusting—so you increase working time and save gas.

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SAFETY FEATURES—Oversize equalizing chamber removes compression heat hazard. Relief valve operates instantly in case of excessive pressure.

Why waste time and gas with worn-out regulators? Accurate, long-wearing VICTOR Safety Regulators are available for almost every use and gas; for pressures up to and beyond 5,000 PSI; for volumes up to 2,000 CFM. Ask your VICTOR dealer to show you. Call him NOW.

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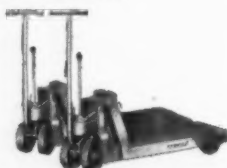


SERVICE FORGEWELD CASTERS

Unbreakable Forgeweld Casters are engineered by SERVICE . . . for service—year after year. Roller bearing wheels and double-row ball bearing swivels assure easy action. Available with steel or floor-protective wheels—sizes and types to fit all needs.

SERVICE HYDRAULIC LEVERLIFT FLOOR TRUCKS

SERVICE Leverlifts ease lifting and moving skid or pallet loads up to 6000 lbs. Feature all-welded, steel construction, hydraulic lifting and smooth-rolling running gear . . . many capacities, platform styles and sizes. NEW model, especially designed, simplifies handling of double-faced pallets.



SERVICE LIFTABLE

The SERVICE Liftable is a hand truck, rolling easily on Forgeweld Casters and Wheels. It's a lifter, handling a ton with a few turns of a crank. It's a work table—adjustable and portable with a sturdy steel top. 26" x 43" top raises from 28" to 42" —2000 pounds capacity.



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It's the fork lift truck so good that military needs take all we can make. Soon, we hope, you will be able to buy it again—the best truck for most jobs in most plants. Keep MoTowLift in mind!



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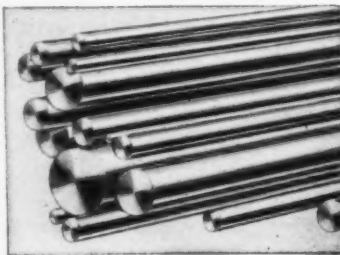
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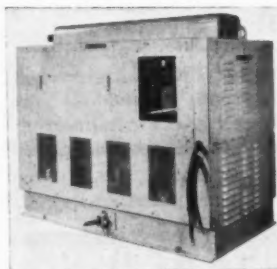
Two new lead-bearing steels for improved machinability



Two new lead-bearing steels are being produced by La Salle Steel Co. "Super La-Led" is a free-machining, open hearth steel, containing about ¼% lead and nearly ½% sulphur, giving it highest sulphur content of any commercially produced steel. It can be used to replace brass since its composition makes for exceptional machinability. It is recommended for applications where full advantage can be taken of its superior cutting speed.

"Leaded TS 4140 Modified" is a lead-bearing alloy which will machine one-third faster than its comparable non-leaded grade. Both available in cold drawn in various size ranges in rounds and hexagons.

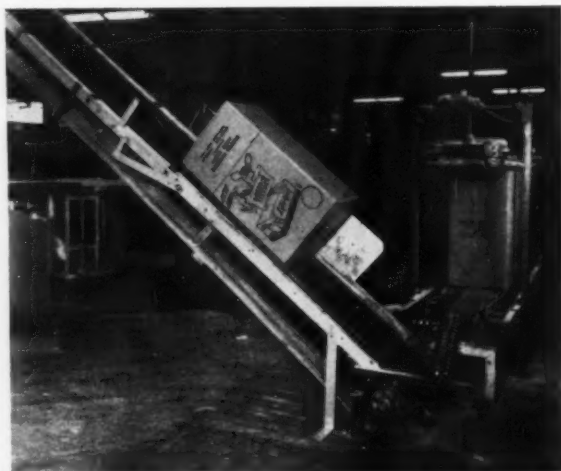
New continuous duty power unit



This general purpose continuous-duty power unit for all types of electric trucks is manufactured by The Ready-Power Co. Unit is known as Model H-A and it is rated at 36-48-60 or 72 volts for use with 4,000-lb. fork trucks, 10,000-lb. platform trucks and 6,000-lb. crane trucks.

Advanced engineering features have simplified maintenance, improved operation and reduced operating costs.

New conveyor belting makes mole hills out of mountains



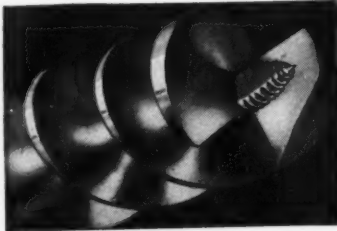
Handling materials on inclines as steep as 42 deg. is the performance record of "Safety-Grip" rough top conveyor belting developed by Quaker Rubber Corp. It is constructed with thousands of fingerlike rubber tentacles that grip and hold extremely slippery materials and can carry wax-surfaced cartons, ice, tin plate, glass, and tile up

steep inclines without slipping or sliding. It flexes over minimum diameters smoothly and easily. Pulleys of 2 in. per ply are recommended, although smaller diameters have been used with satisfactory results. Belt construction is usually three plies of duck and a minimum of 3/32 in. top cover thickness by friction bottom surface.

841

Power bit with brad-screw point

A newly designed power bit, the "50-50," is designed for fully controlled power drilling in any three-jawed chuck.



It will drill smoother, cleaner-cut holes, faster and easier, in any soft or hardwood; can be started and stopped at any time, at any depth, without jamming or binding, even when used with lightweight 1/4-in. drills.

Brad and screw type points are combined in a specially pitched single thread point. Single shortened spur, instead of the conventional two, helps balance the cutting action, required less power and end pressure. Available from Stanley Tools.

842

You can seal and label your bags in one operation

Automatic sealing and labeling of bags is the function of the Amsco HiSpeed automatic jaw sealing machine with vacuum labeling attachment. Operator simply places filled bag into position and touches a hand-trip starter plate with



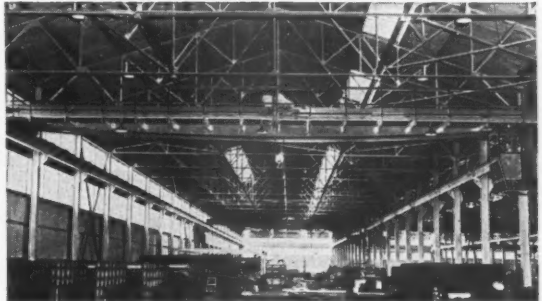
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You will be amazed at the low cost of a heavy duty, high speed Shepard Niles Overhead Crane such as shown in the photo above. To convince you we suggest you get our bid LAST or ask our satisfied customers where they got the most crane for the money with satisfaction built in. "A western company serving western industry."

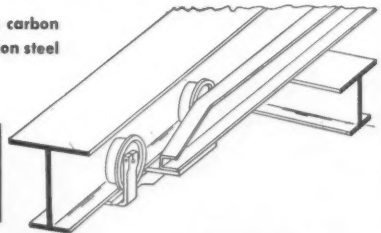
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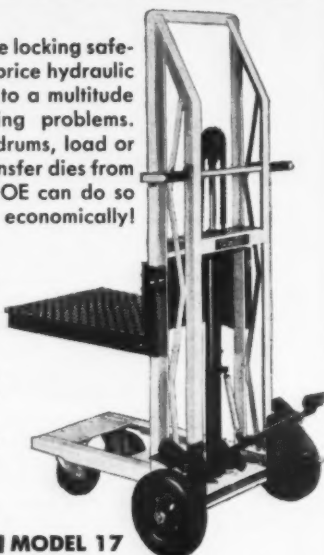
Equipped with positive locking safety brakes, these low price hydraulic units are the answer to a multitude of Materials Handling problems. One man can stack drums, load or unload tail-gates, transfer dies from shelf to press—BIG JOE can do so many things, and so economically!

NEW MODEL 14-S

Custom Platform Lift

Equipped with 6" casters.
Lifting capacity 750 lb.
Lifting height 55½ in.

Price \$256.50



MODEL 17

Adjustable Fork Lift

Built for safe, easy, long time operation.
Capacity 750 lb.
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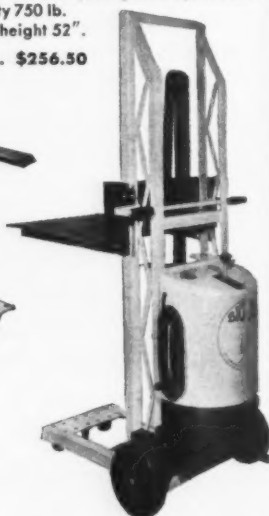
MODEL 22

Battery-Operated Hydraulic Lift

Finger tip control. Self contained battery charger. Capacity 800 lb. Lifting height 52 in.

Price \$587.50

(Above unit with lifting height of 66 in., \$647.50; or lifting height of 78 in., \$687.50.)



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WESTERN PACKAGING
AND MATERIALS
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the back of his hand. A folding bar automatically guides bag top and label between jaws simultaneously with automatic feeding of another label by vacuum labeling attachment. Labels with face widths from 3 to 7 in. can be used. Available from *Amsco Packaging Machinery, Inc.*

843

Semi-automatic nailing tool for any pneumatic hammer



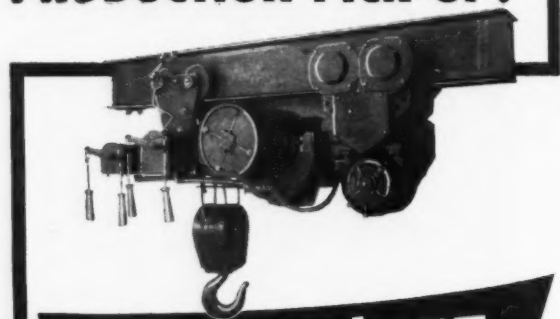
"Fox Nailer" is a semi-automatic nailing tool that attaches to any pneumatic hammer with a No. 2 Morse taper. It is only six in. long and weighs one lb. It consists of four parts, two of them moving parts. Nail is fed head first into muzzle of nailer and driven by rapid blows of an alloy steel plunger when trigger is pulled. On overhead nailing jobs, this tool substantially reduces operator fatigue and nailing time. A product of *Fox Nailer Corp.*

844

Rubber and steel combination make highly durable tire

"Notat" tires, because of their unique construction are not subject to puncture, blowout or deflation. Nails, hot

PRODUCTION PICK-UP:



ELECTROLIFT

worm drive hoist

Watch your production pick up with these time-saving, manpower-saving hoists. You can move materials faster, smoother, quieter with ElectroLift.

Wide variety of one-man models, for safe movement of loads up to 6 tons. Available with push-button control for pin-point accuracy.

For further features write for Bulletin 36, or consult your ElectroLift representative listed in telephone directory.



ELECTROLIFT, INC., 30 CHURCH ST., NEW YORK 7, N. Y.

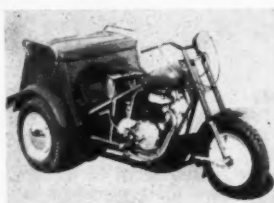
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iron, scrap metal, spikes and other hazards do not render them useless. They are designed for mounting on split wheels. Tires consist of a series of amalgamated high quality rubber and fabric pads, through which an internal steel band is threaded. Pads are pressed together under hydraulic pressure for fastening of the internal steel band, and when released, form a continuous resilient unit, which has the same bounce and cushion traction as a pneumatic tire. Manufactured by *Star-Barn Rubber Co.*, and distributed through *Hamerslag Equipment Co.*

845

For pickup and delivery service

A lightweight, maneuverable cycle has a roomy heavy gauge steel body and a load capacity of 300 lb. Its sensible



speed and safety factors make it ideal for use in heavy metropolitan areas. Other essential features include hand-operated clutch, foot shift, three-speed transmission, telescopic front forks and all the latest engineering improvements in light delivery equipment. An added

accessory for this "Delivercycle" is an adjustable tow bar. This standard hitch is a tubular design with universal joint. Produced by *Mustang Motorcycle Corp.*

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METAL-WASHING MACHINE
WORKING?



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8 things
to look for
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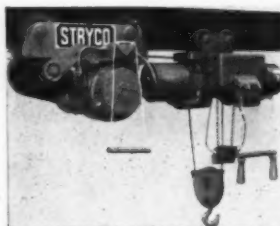
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846

Overhead monorail crane system

Stryco tractor, developed by Stryco Manufacturing Co., is a tractor unit fabricated from structural plates and angle sections, all rigidly welded into a compact frame upon



which motor is mounted. Motor is fluid coupled reducing unit imparting motion to tractor tire shaft through a roller chain sprocket drive. Tire is pneumatic and shaft on which it is mounted is carried in sealed self-aligning ball bearings. Tire is adjustable up and down for pressure on underside of monorail track. Wheels

suspending tractor are steel with hardened treads and are equipped with ball bearings. Control is by either rope or push button. These tractors are made to push or pull hoisting units along monorails, or on cranes and are provided with tow pins on each end for attachment.

847

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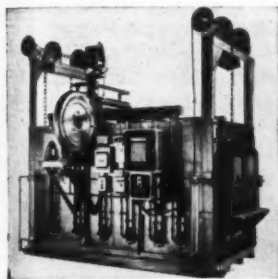
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are made from materials that retain their shape and wear indefinitely and are interchangeable on all tool grinders. Inexpensive kits contain diamond compound, lapping wheel, lapping oil, applicator and wheel charging roller.

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FIG. 1452
Heavy duty bar handle platform truck



FIG. 1501-X
"Auto-Load" Barrel Truck



FIG. 1011
Balance-type platform stake truck



FIG. 1112 DPL
Light weight 2-wheel utility truck



FIG. 16
Western Pattern with Steam Bent Handles



FIG. 216
Golden Gate Pattern

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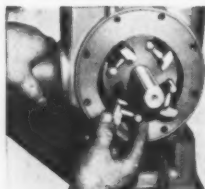
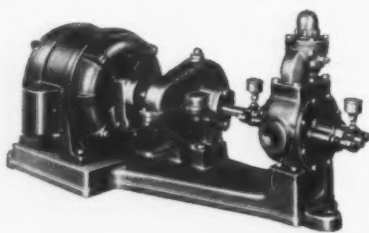
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they are small, inexpensive and easy to install. Both plain and flanged types are available, and various types are made that set at different heights or are fitted into a recess with only top of ball bearing protruding. Available from *Alpha Tool and Supply Co.*

New Dico model is two trucks in one

850

A combination box and bag truck features an ingeniously engineered, heavy hinged bag nose-plate that is snap-locked securely against frame when standard tow fork is used for boxes and crates. Truck is converted to a bag truck by simply pressing foot release pedal, which flips nose plate down over toe fork. This all-steel hand truck has completely enclosed steel box side shafts; unbreakable formed steel wheel brackets; scientifically designed axle assembly with end bolts enclosed; straight or curved wooden handles. Truck will save handling time because of its two-in-one



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Fork lift truck has 6,000-lb. capacity

851



The Buda Co. has added to its materials handling line 6,000-lb. capacity fork lift trucks which are available with either gasoline or diesel engines. They are rated at a 24-in. load center. Additional features include accessibility of all parts for service and maintenance; complete complement of electrical gauges on full front vision instrument panel;

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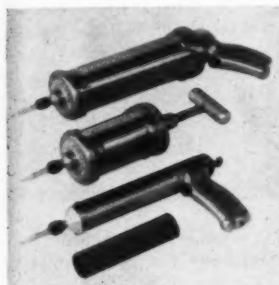
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automotive type single lever gear shift, mounted on steering column; and quick change heavy duty industrial type bench.

852

Applying sealing compounds with "military" precision

Designed for pressure extrusion of caulking and sealing compounds, mastics and LP materials is a new line of air and screw pressure flo guns for operation on usual air line pressures. Three sizes (3/10 pt., 1 pt., and 1 qt.) are available. Two larger sizes may be obtained with either steel or stainless steel barrels, while disposable barrels are offered with small sizes for use with extra sticky or fast setting compounds, thereby eliminating cleaning jobs. Two different types of nozzles furnished with each gun. Manufacturer is *Salsbury Corp.*



853

Up hills and down dales

A conveyor belt for carrying packages or articles up or down inclines of 25 to 30 deg. is available from *Baldwin Belting, Inc.* This "Tread-Top" belting has a non-skid cover that grips like the tread on a tire. It is made with a special lightweight, closely woven fabric, having exceptional tensile strength. Fabric is full width. It is not folded and has no splices. Its flexibility enables it to run perfectly over pulleys as small as two in. in diameter. Belting is made of natural rubber throughout. It is a rich brown color and can be easily cleaned. Multiple plies hold metal fasteners exceptionally well. It is waterproof and has a minimum of shrinkage.

854

Grinders for use with mounted wheels and points

Three extremely lightweight, maneuverable and powerful utility hand grinders for use with mounted wheels and points are now available from *Skilsaw, Inc.* A steel carrying

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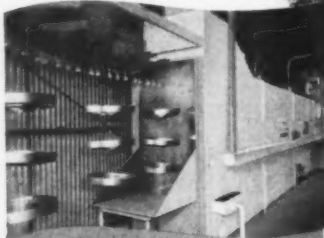
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case with a rack for mounted wheels and points, as well as a dressing stone and chuck wrenches, is included with each model. Model 137 is equipped with a 5/32-in. capacity geared chuck and has speed of 20,000 rpm. Model 146 also has speed of 20,000 rpm., but comes with 1/8 and 1/4-in collet chucks. Model 148 has an ultra high speed of 36,000 rpm., and 1/8 and 1/4-in. collet chucks.

855

New unit for measuring elapsed time

A new counter-chronograph measures elapsed time in steps of .000000125 second. Intervalometer incorporates an 8 mc. crystal oven for a precise time cycle generator. Unique gating techniques limit error in measurement to plus or minus one-eighth microsecond. Results are exhibited on readout lamps in discrete numbers, in whole decimals from a microsecond up, in fractions down to one-eighth microsecond. For intervals longer than one second, unit will re-cycle and an external mechanical register may be used to extend the count. Available from *Potter Instrument Co., Inc.*

856

Carton set-up machine reduces labor costs 85%

"Convey-O-Mat" automatic carton set-up machine, produced by *Machinery Manufacturing Co., Inc.*, enables manufacturers to achieve uniform line production of continuous output of packaged products and cut labor costs by 85%. It delivers set-up carton in an upright position on conveyor, ready to receive product, and propels it along a chute of desired length. While cartons are in chute, product and inserts are loaded. Convey-O-Mat will do the work of several people but occupies less space than a small office desk. It handles a wide range of carton sizes. Speed,

easily adjusted by an external control, is 30 to 60 cartons per minute.

857

Ball bearing bench grinder

A new 1/4-hp. ball bearing bench grinder has a flat grinder housing which permits operator to maneuver castings or parts to be ground so that both sides of each grinding wheel

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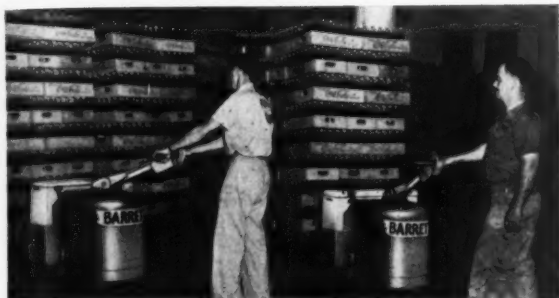
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may be used. Motor is full ball bearing, constant-speed induction type. Grinder is equipped with adjustable tool rests and safety wheel guards which are wide enough to permit use of wire wheel brushes. A toggle-type switch is enclosed in a molded case at base. Grinder comes completely furnished with three-wire rubber covered cord with ground connections, firm-gripping rubber feet, 6 x 5/8-in. grinding wheels, and wheel guards and tool rests. Available from *Stanley Electric Tools*.

858

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Pushing, tugging and straining are eliminated when goods are transported by a "Power Ox." This lift truck travels electrically; operator simply walks along with loaded truck controlling lifting, traveling and lowering by a convenient push button in the handle. With a 4,000-lb. capacity, a Power Ox can now do the handling work previously done by three men with three hand lift trucks. This unit, manufactured by *Barrett-Cravens Co.*, is suitable for transporting anything from steel castings to paper products.

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New publication deals with statistical theory

A book by Dr. Anders Hald of University of Copenhagen, entitled "Statistical Theory with Engineering Applications," is designed for engineers engaged in scientific and industrial research and production. Text covers a large part of the statistical theory that has evolved during the past fifty years, with emphasis on methods developed by R. A. Fisher. Professor Hald draws upon his own engineering experience to provide practical illustration, and the result is a simple and coherent exposition of the theory without use of advanced mathematics. Volume is priced at \$9.00. Publisher is *John Wiley & Sons, Inc.*

Bacon issues publicity checker

To assist firms in handling publicity, "Bacon's Publicity Checker" is published by *Bacon's Clipping Bureau*. This 192-page book, priced at \$10.00, compiles an alphabetical list of 2,272 business papers, consumer magazines and farm papers. These periodicals are

also listed in 99 market groups with information as to address, editor, frequency of issue, date of issue, circulation and publisher. After the listing of each publication in the market classification section there is space for record keeping to eliminate the necessity of setting up separate card files for release lists. Also included is a practical discussion of how to handle editorial publicity in business papers, with a series of case studies to show how to break the publicity job down by market groups.

For those desiring Navy subcontracts

Office of Naval Materiel, Washington, D. C., has prepared a 40-page book to help small manufacturers seeking sub-contracts with Navy defense contractors. In addition to helpful information on developing and obtaining subcontracts, the publication contains a state-by-state directory of the Navy's major prime contractors. This directory lists the name of company, location, name of small business sub-

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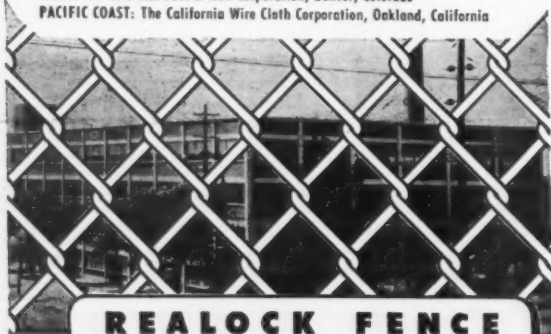
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"Practical Metallurgy for Engineers"

To aid metallurgists faced with new production problems in a defense economy, a new edition of "Practical Metallurgy for Engineers" has just been issued by the research staff of E. F. Houghton & Co. It presents the latest standards and practices followed in the metal industry today. Also included is a discussion of future probabilities relating to new metals, new alloying elements and new types of heat treatment. This well-illustrated, 599-page edition sells for \$3.00.

Petroleum industry described in picture-book form

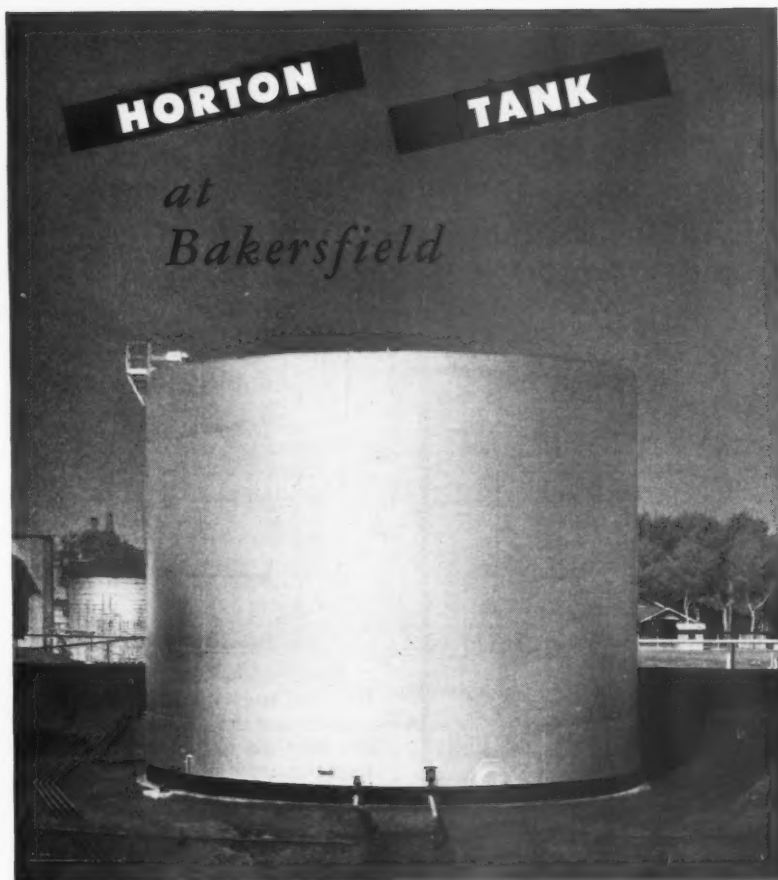
An over all outline of the nation's oil industry is presented in "The Oilmen," a pictorial booklet, just published by Rinehart & Co.

In this volume, the petroleum business is described by means of 174 photographs of men and women at work in its various phases. Clean cut captions tie the story together. Thomas Hollyman, consulting photography editor of *Holiday* magazine, was assigned to take the pictures by Shell Oil Co. Resulting non-commercial book sells for \$1.50 in bookstores.

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USE STANDARD DATA

... begins on page 86

This was required because the plant and the receiving dock were both considerably above the ground level, and also the dock was too narrow to permit the truck to park in an unloading alcove.

The first analysis disclosed that under conditions like this the industrial clamp truck was not as efficient as originally thought. The work pattern was as follows:

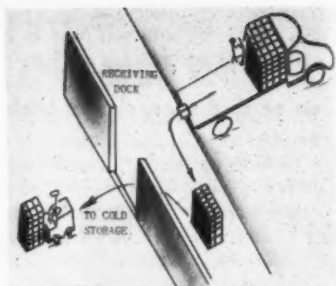
HAND TRUCK

1. Pick up unit load on truck (6 boxes per unit load)
2. Transport load to dock
3. Release load on dock
4. Return to truck for next load

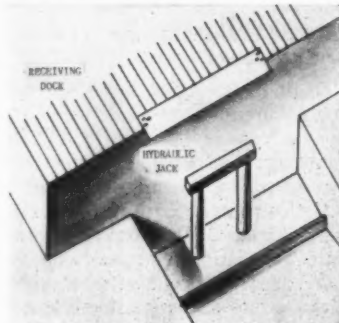
INDUSTRIAL CLAMP TRUCK

1. Wait for first unit load to be built on dock (36 boxes per unit load)
2. Pick up unit load on dock
3. Transport unit load to storage
4. Tier
5. Release unit load in storage
6. Return for next load

The problem now was to eliminate the hand truck operations. At first it was felt that the industrial truck could not drive out on the bed of the road truck, as the bed would break down from the jolt of the industrial truck going on and off the bed. But with all these elements out on paper and the



How to eliminate hand truck operation pictured above. Simply answered when situation is analyzed. Hydraulic jack sustained motor truck bed, enabling lift truck to drive clear out on it.



problem clear it was much easier to approach.

A practical solution was found by

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building a hydraulic jack that would hold the truck bed off the springs, keeping it rigid as a normal runway. With the hydraulic jack, the elements were then reduced to:

INDUSTRIAL CLAMP TRUCK

1. Pick up unit load on truck bed (36 boxes to a unit load)
2. Transport to storage
3. Tier
4. Release load in storage
5. Return for next load

In this case during the original analysis not only have we compared the efficiency of different pieces of equipment but we were also able to do some worthwhile methods analysis.

A belt conveyor and a floor chain have a somewhat different element breakdown. In the case that was used in the graph there are three main categories:

1. Stacking on the belt (each box must be handled individually)
2. Stacking off the belt near the spot of final storage
3. Movement of the boxes to the final place of storage

The third category must be again subdivided into elements. In the case used, the move was done by hand trucks and the tiering manually done in the storage area. The elements were:

1. Pick up unit load (6 boxes per load)
2. Transport loaded
3. Release load
4. Transport empty to the belt
5. Stacking or tiering

Transport on the belt does not consume any man-hours, but there is transport by other means necessary to the final destination as a belt system lacks the flexibility of getting into every spot of the storage area.

Again the value of this type of data is apparent. If a warehouse already has a belt system and does not find it advisable to change, due to reasons such as installation cost, the management can at least now look into ways to improve their present system.

One of the advantages of time study data over other types of data is that time study data requires analysis before it can be correctly recorded. Each element must be studied to see if it can be eliminated or if the time can be reduced. This study brings to light many obvious changes and also invites methods changes and improvements of the actual equipment.

A similar type of study in the production phase can also be made, with results equally as valuable as those obtained in warehousing. The two chief aims of production material handling can be highlighted as follows:

First, by use of actual time figures taken under plant conditions, it is possible to balance the material handlers to the production line and in many cases reduce the number of material

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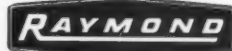
● **OPERATES IN CRAMPED AREAS** Operates with ease inside truck trailers, boxcars, elevators—also in narrow aisles, crowded production areas.

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handlers needed to handle the load.

Second, the handling equipment can be studied in the same manner as was done in the warehouse and then analyzed with the object of production material handling in mind, mainly to obtain correct flow to the production worker without wasting the handlers' time or leaving the productive equipment idle.

Job Breakdown

A similar procedure is used to set up the work of the production material handler as is used with the warehouse material handler. Each job is broken down to the basic elements and analyzed by studying the pick-ups, transports, and releases. A flow chart should be made and then a work load chart (Simo chart—see page 89 for illustration) prepared based on the work flow and the time needed for each job. A solution to a typical material handling question was solved in the following manner.

The problem first appeared to be the purchase of additional equipment in order to keep a smooth flow of material to the various work stations and eliminate idle periods of production due to waits for material. To all appearances the material handler and his electric hand truck were continually

on the move and could not handle the work.

The material handling operation was then broken down to see what actual jobs the operator was responsible for and the frequency determined, from production standards, to supply material to or move it from the job. The moves were then plotted on a flow chart in order to reduce all possible transport empties, and then the work load plotted against the requirements as found from production data. This type of analysis showed that not only was a second electric hand truck unnecessary but that the original truck was used only 41% of the time.

Extra Equipment Avoided

Another similar situation arose on handling heavy steel material and scrap to and from a production area. The production department requested a second fork lift truck to ease the burden on the truck currently being used.

A flow and work load chart analysis highlighted bad methods being used and showed production where the problem would not best be solved by additional equipment but could be solved by a simple rearrangement of the stock areas and planning on the part of the supervisor to encourage a work pattern for the fork lift truck.



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**MATERIAL HANDLING
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COAST PORTS

... begins on page 82

terminal operations, since each cargo may be different in size, weight, packaging and content, just as each ship may vary to a degree in its cargo loading accessibility via hatch, sideport, or deckload.

Moreover, the complexity of ship cargo-handling is multiplied by the diversity of ownership, management, traders, union representatives and workers involved in the process of moving the product from land carrier, between land carrier and ship's hold or vice-versa.

Competitive Cost Comparisons

Cargo-handling must also relate its total costs to the competition of other ports and terminals, to other types of transportation, and to the ultimate benefit to the workers, the management-owners and stockholders, and to the community. As cargo-handling costs or delays become associated with a public or private operation, the cargo flow may shift to another port or another carrier and is returned to the home port with great difficulty or perhaps not at all.

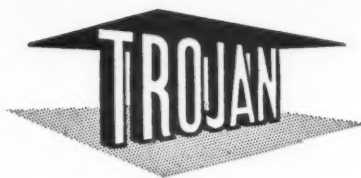
Some years ago, a study of this type was made by the Federal Maritime Commission concerning the problem of establishing terminal rates and charges. The Bay Area terminals were the test-case for a survey made by Howard G. Freas, Rate Expert, California Public Utilities Commission.

This study featured "A Formula for Cost Finding in Terminal Operations," and emerged as a pattern for applying terminal costs, without mandatory or regulatory implications, to any considered revision of terminal charges. While it has not been universally used, the "Freas Formula" has proved to be a helpful tool in a practical and co-operative approach to the review and establishment of revised terminal rates and charges.

Handling Cost Studies

Similar studies are being made by the Federal government and private industry relative to the costs of handling and stowing cargo aboard vessels between ports of call. A formula for cost-finding flexible enough for various types of cargoes and ships, and acceptable to agencies of government, private industry and labor organizations, would be another strong link in the chain of interest between ocean transportation and the port community.

This is one of the major problems being considered by the San Francisco Bay Ports Commission, established on the recommendation of the California



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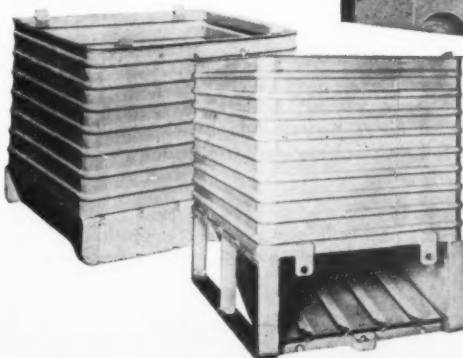
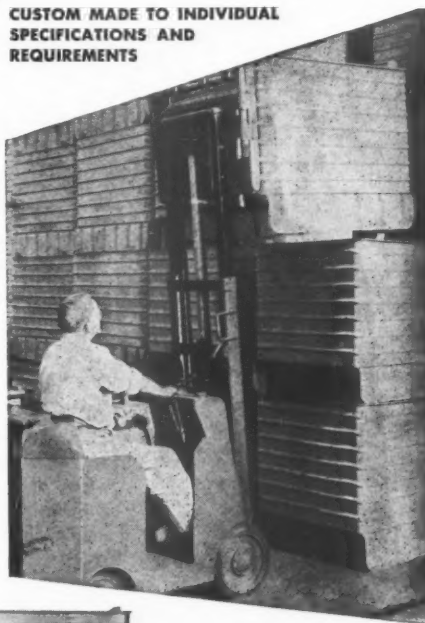


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Senate Fact-finding Committee to assist in determining scope and type of harbor-wide organization needed for Bay ports and maritime industries.

The Commission's primary aim is to investigate those problems which would be considered worthy of continuing review and action by the ports, terminals and shipping interests of the Bay Area. One of the functions of such an organization may be special research in the field of materials, or cargo-handling, as all freight is termed "cargo" in ports and maritime industries. For this reason the Commission is interested in securing new informa-

tion and data on materials and cargo handling surveys and methods. This would be incorporated in any final report.

A Forward Step

Even if the problem, which will definitely be a continuing one, is tackled piecemeal, it would be a step in the right direction. Teamwork between industry, management and labor is an essential ingredient of any long-range program to reduce time and costs, thereby making the ports and shipping a profitable operation that affords steady employment.

The ratio of fork-lift and other mechanized equipment as well as various types of conveyor units, is probably as high in the Bay Area shipping industry as in other major harbor areas of the nation, although comprehensive comparative studies have not been made. The ratio is considered substantially below that used in rail, truck and warehouse operations. The pay-off is on the itemized cost of handling a specified type of general or dry cargo, and even this may vary with cargo location on the pier, the type and condition of pier facilities and even the weather and other imponderables.

It would not seem impossible, however, to strive for a cost-formula that would be mutually acceptable to a co-operative group of leaders from labor and management who would work objectively together in a drive for a mutually profitable port operation.

Factors in Traffic Rates

In the field of traffic rates, establishment of such rates is usually based upon three factors: (1) costs, (2) competition, (3) what will the traffic bear? In other words, cargo or freight movements should be governed by the same three points without attempting to gain more than their rightful share of the total cost load borne by the through shipment.

Following these formulae, any study of cargo-handling at port or terminal facilities would closely parallel similar analyses of materials handling in a factory warehouse or distribution center.

This might include data to determine the saturation point of effectiveness of palletization. Some types of cargoes have definite limitations in pallet usage. While one steamship line may be able to handle up to 70 per cent of its cargoes with pallets, another carrier may find that this ratio is entirely out of line. This may change with the types of cargoes, the container size, the type of pallet and other factors.

Palletization Steps Up Tonnage

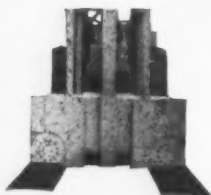
Palletization has also proved valuable in stepping up the tonnage of cargo moved per gang hour and both San Francisco and Oakland port terminal facilities make heavy usage of wooden pallets in general cargo handling. These two ports have also subsidized a pallet pool operation to sort, pile and make available returnable pallets to the carriers and shippers serving their facilities.

Studies made to compare the value of new cargo handling methods have shown that any new procedures involving mechanized handling or packaged units call for participation of all

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handling groups from shipper to consignee, or at least for that leg of the movement where the new method is introduced.

Coastwise lumber shipping, for instance, managed to stage a reasonable revival through the use of steel-strapped unit loads. It was essential to this project, however, that the water carrier, terminal facility and land-carrier be ready and equipped to handle this consolidated lumber package to effect a total cargo movement at competitive rates.

A Formula for Cost Analysis

One major steamship line established a simple formula for a study of cargo handling costs and time and cost factors in its own stevedoring operations. This formula followed sound principles of industrial engineering analysis as follows:

1. Observe and examine present methods.
2. Determine reasons for present methods.
3. Investigate limits of factors under control of stevedoring activities.
4. Formulate specific proposed plan for improvement.
5. Compare time and cost factors of present and proposed methods.

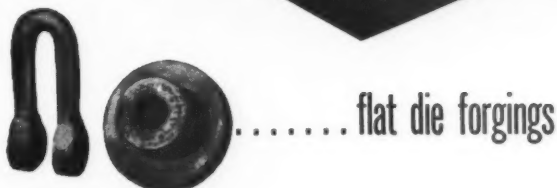
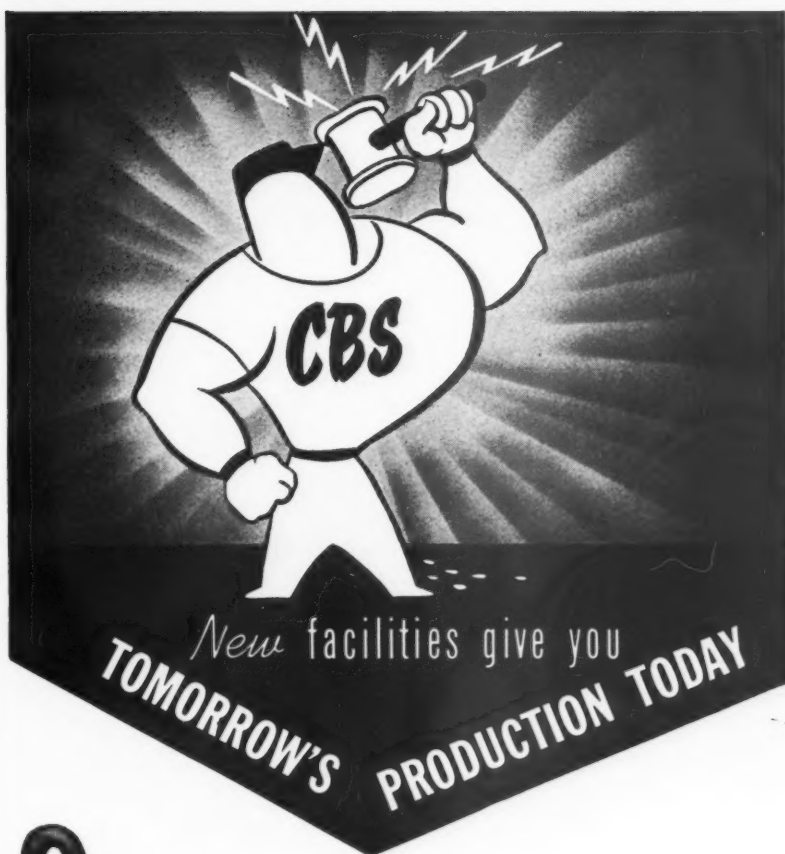
Point No. 3 was considered especially important, since it calls for factual information assuring that the proposed plans are practicable, immediately applicable to stevedoring activities and are not in violation of any physical, contractual or operating conditions.

Defining the Operations

In carrying out the details of cargo-handling study, certain definitions must be established so that each cycle of operation can be measured. This requires analysis of time and cost from the point of transfer, that is, from one crew of workers who perform a certain job to another crew which performs another phase of the total handling procedure. The cycle of operations involves a study of the pace, or average speed, measured in tons per gang-hour.

In brief, a port materials handling study may consider these points:

1. Description and mapping or charting of existing buildings, facilities and cargo handling equipment.
2. Analysis of the means of transport by which cargo is moved on and off the piers or wharves, coupled with analysis of the materials handling equipment provided by the connecting carriers.
3. Tracing the movement or flow of cargo, incoming, outgoing and stored in transit, together with a study of the present methods of handling, with special reference to labor productivity.
4. Analysis of cargo according to commodities, package or unit load sizes, damage hazards, quantities involved.
5. Investigation of records and checking required for all purposes.
6. Analysis and comparison of tonnage handling costs—based on labor, distance



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moved, time per trip, tons handled, methods of handling, power, depreciation, repairs and maintenance, insurance, taxes, breakage, value of floor space, and other necessary items.

7. Study of various alternate cargo handling methods, making comparisons with methods in use by other ports and by industry generally.
8. Justification of any proposed changes or investment in new facilities or equipment in terms of operational cost savings.

This does not attempt to cover all the complex situations which arise in any cargo-handling study, but it gives the principal subjects to be given consideration. Also, it is possible to make a much simpler spot-check survey of cargo-handling activities and prob-

lems which would be the foundation for any extensive survey.

It should be pointed out however, that Bay Area ports, terminals and shipping facilities are taking important steps to break the bottlenecks of cargo flow, insofar as structural projects are concerned.

Modernization at San Francisco

The Port of San Francisco has just completed one \$10,000,000 development program and is launching another similar program, involving the modernization of older pier facilities and doubling the capacity of the grain terminal.

One of the finest ocean terminals on

the West Coast is the new Mission Rock Terminal, a \$6,000,000 project especially adapted to rail and truck cargo movements.

Taking steps to reduce the congestion at the wharves caused by truck delay on narrow, finger-type piers, the state-owned Port of San Francisco, with the cooperation of Matson Navigation Company, has just completed the \$2,500,000 quay-type pier between piers 30 and 32. This project required a concrete fill in the marginal water berths to accommodate swift delivery of trucked cargoes. The depressed trucking space affords tail-gate delivery direct to the covered transit sheds at shipside.

The Foreign Trade Zone, at Pier 45, is storing and processing an increasing volume of import products through its modern, accessible pier facilities at Pier 45.

Progress at Oakland

The Port of Oakland has also constructed many new pier facilities of modern design in accordance with a long-range master plan. Richmond and Stockton are also building and planning new facilities for expanded commerce.

Port of Oakland has the advantages of modern-type construction for most of its pier facilities, with an excellent pattern of cargo flow through transit sheds and shipside storage to ship's hold. Howard and Encinal Terminals, privately operated, also have worked out effective systems of cargo-handling within the scope of their facilities.

One of the outstanding cargo-handling programs in the Bay Area is that of the Naval Supply Center at Oakland, as well as the Army Supply Base.

Under the stress of military demands, the Navy built a materials-handling task force and program of coordinated operations that ranks among the best in the nation. In World War II and at the peak of the Korean War, the Naval Supply Center, Cargo-Handling Section Base, has been a unique test-tube for cargo-handling techniques. This project continues as a valuable source of information and data on cargo-handling problems.

We Have What We Need

In summary, it should be emphasized that the tools, the know-how and the cargoes are here at hand in the Bay Area ports and terminal areas. The incentive lies in the fact that one out of every three Bay Area residents earns a living directly or indirectly from harbor activities. The value of waterborne commerce is estimated in excess of \$100,000,000 monthly for Bay Area ports under normal operating conditions.



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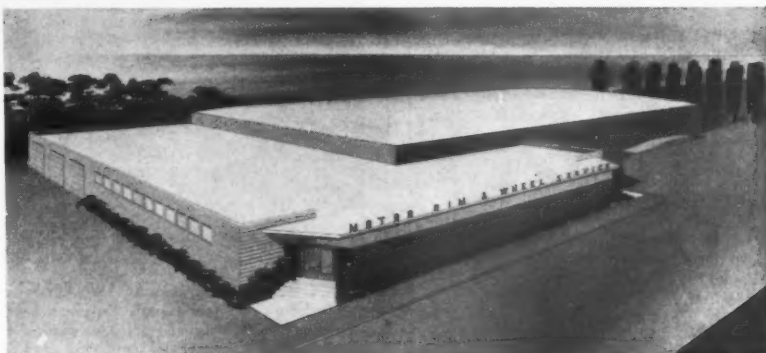
ARIZONA

BM&T OPENS NEW PLANT—Blake, Moffitt & Towne opens its new modern distributing plant at 610 S. Park Ave., Tucson. Brick structure provides over 20,000 sq. ft., representing more than a 200% increase over former location occupied by company since 1929.

COTTON COMPRESSOR CONSTRUCTED—Federal Compress and Warehouse Co. begins construction of a cotton compress machine and three warehouses in Yuma. Compress, weighing 150 tons, is being shipped from Memphis, Tenn. It reduces a bale of cotton to less than half its original size for easier shipments and has a capacity of from 75 to 125 bales per hour. Company hopes for completion of compress and warehouse construction by Sept. 15.

CALIFORNIA

VIBRADAMP FORMS NEW DIVISION—Aero-Coustic Division of Vibradamp Corp. is formed and opens offices and production facilities at 3116 Van Owen Blvd., Burbank. Division will custom engineer, design and fabricate specialized



MOTOR RIM AND WHEEL BUILDS—Motor Rim and Wheel Service of California, transportation service engineer, is building a 40,000-sq. ft. industrial structure on East Pico Blvd., Los Angeles. Project is designed for straight-line production service from factory to railroad car to user, and is sole building in nation planned for this type of automotive wheel transportation service. William J. Moran Co., Alhambra, designed and is now constructing project scheduled for completion Sept. 1. All walls of building will be of precast reinforced concrete, a type pioneered by Moran Co.

thermal and acoustical insulation materials for aircraft and a wide range of industrial products.

ERENBERG ENTERPRISES FORMS—David Erenberg Enterprises forms to include Derenson's and State Manufac-

turing Co. of Los Angeles and Walter Manufacturing Co. of Oakland, furniture manufacturers. Milton R. Brown, previously sales manager for Derenson's is now sales manager of David Erenberg Enterprises. T. R. Thompson, formerly sales manager for State, transfers to San

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"Vic's Vacation"

By CARL FRAZER

While Vic is vacationing with his family somewhere in the High Sierra country, trying to tame a tasty trout, no doubt, I find myself confronted with a column to write. By way of introduction my name is Carl Frazer, P. A., Office Manager, Chief Scheduler of Gear Reducers, Gas Engines, Pumping Units and Assistant Columnist of Pacific Coast Division. Just in case you are wondering what an Assistant Columnist looks like, the following is a reasonable facsimile.

Besides, Fawcett doesn't slip up like this very often, so I might as well make the most of my opportunity!

First of all, allow me to say that they could fill libraries with what I should or should not know about writing. But this I do know, from my day to day experiences in this office (*Lufkin's* Western headquarters), we are making important progress in the industrial gear field. We are gratified at the acceptance *Lufkin* gears are receiving up and down the coast. I guess the experience we have gained in producing nearly 40,000 Herringbone single and double Reduction units for the oil industry nationally is the reason *Lufkin* reducers and High Speed Increaseers are now to be found in pipelining refineries, induced draft cooling-towers (spiral bevells) chemical plants, rubber mills, and so on.

Delivery promises are important too in my job. Our commitments are carefully checked with the home office at Lufkin, Texas. At present, we are fulfilling regularly, on time, 12-week deliveries on our full line of Herringbone Speed Reducers and High Speed Increaseers.

Then, of course, the large stock maintained in our L. A. Warehouse—oh, excuse me, there goes the phone—you guessed it—the man wants a *Lufkin* gear—needs it in a hurry. Enjoyed visiting with you. So until our gear manager gets back, this is Carl Frazer signing off for

Vic Fawcett

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Carl Frazer



CAN OPENER—American Can Co. opens a 296,000-sq. ft. plant on a 39-acre tract at Highway 50 and South California St., Stockton. Plant houses a battery of high-speed can-manufacturing lines, each capable of producing up to 450 cans a minute. New factory has a rated capacity of 350,000,000 fruit and vegetable cans a year to serve San Joaquin Valley and Delta area canners. In addition to the most modern can-production facilities in the world, new facilities include a cafeteria for 250 people, locker rooms, a fully-equipped and staffed medical department, business offices and a machine shop.

Francisco where he will handle sales for all three firms in Northern California, Oregon and Washington. All three factories distribute to eleven Western states.

NORTHROP STARTS TRAINING PROGRAM—Northrop Aircraft, Inc., starts one of West Coast's first guided missile training programs. For a six-month period, Northrop technicians will instruct trainees, 90 civilian personnel, officers and U. S. Air Force men, in theory, design, maintenance and repair of guided missiles. Advanced training classes in electronics will be held at a specially prepared Northrop facility at company's Hawthorne plant.

PACIFIC GAS CORP. CONTROLS GASAIR—Pacific Gas Corp., supplier and installer of liquified petroleum gas systems, purchases a controlling interest in Gasair Corp., San Francisco manufacturer of direct-fired vaporizing and air-gas mixing equipment for liquified petroleum.

ADAMO BUYS COAST COTTON MILL—Adamo Co., manufacturer of cotton carpeting, acquires Coast Cotton Mill, sole cotton spindle concern in Southern California. Purchase makes Adamo only company with completely vertical carpet mill west of Mississippi River.

GRAIN ELEVATOR FOR MILLER MALTING—Miller Malting Co., Los Angeles, will construct a 1,000,000-bushel elevator for storage of grain purchased in San Joaquin and Sacramento Valleys. Plant, costing \$2,000,000, may later be expanded to accommodate 3,000,000 bushels.

TRACERLAB MOVES TO RICHMOND—Tracerlab Co. will build a \$160,000 building to serve as Richmond headquarters on a two and one-half acre site fronting Wright Ave. Tracerlab, constructors of instruments for detection of radioactivity, has designed and produced radiation monitoring instruments for U. S. Signal Corps and civil defense agencies. Upon completion of project, its Western division will move 65 em-

ployees from its present Berkeley plant and will add new personnel as new plant expands.

NPA GRANTS CERTIFICATES OF NECESSITY—National Production Authority gives certificates of necessity for rapid tax amortization to following California firms: Union Carbide & Carbon Corp., Los Angeles County, polyethy-



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lene project costing \$36,323,000, 60% write-off; Southern California Edison Co., Los Angeles, oil and gas pipe line, \$2,525,000, 40% write-off; Mar Vista Engineering Co., Los Angeles, aircraft parts, \$270,526, 70% write-off; Russell, Burdall & Ward, Bolt & Nut Co., Los Angeles, precision fasteners for military end items, \$132,906, 65% write-off; Cal-Ore Pipeline Co., San Francisco, petroleum pipeline, \$2,000,000, 25% write-off.

BECKMAN BUYS CORP. — Beckman Instrument Co., Pasadena, buys and assumes operation of Berkeley Scientific Corp., located at S. Twenty-third St. and Wright Ave., in Richmond.

CHICO MOVE FOR ALMOND PLANT

—Rosenberg Brothers & Co. is building a 40,000-sq. ft. almond processing plant at Chico in preparation for moving its main operations from Oakland. Location for facility is bounded by First and Cherry, Second and Orange Streets.

AMERICAN POTASH BUILDS LAB—

American Potash & Chemical Corp. starts construction of a \$300,000 research laboratory in Whittier to supplement laboratory and pilot plant at firm's Trona operating headquarters. Building is scheduled for completion early in 1953. New laboratory will be used initially for research on boron and lithium compounds derived from company's raw materials. Some 50 people will be employed there.

WP SHOPS BUILD FUEL TANKS—

Western Pacific Railroad Co.'s Oroville shops commence construction of fuel oil tanks for diesel locomotives as starting move in a two-year reconstruction program. Project is outgrowth of converting all of line's motive power to diesel making present roundhouse for steam power obsolete. This structure will be torn down when a new unit is built. Oroville shop makes almost every repair on oil burners and works on Western Pacific locomotives sent in from line running from Oakland to Salt Lake City.

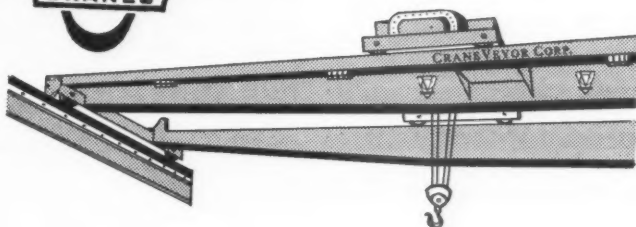
SCHUCKL SELLS NILES CANNERY—

Schuckl & Co., Inc., Sunnyvale canning firm, sells its Niles plant to American Chemical Paint Co. of Pennsylvania. Schuckl will vacate plant in October after close of current canning season. Niles plant operations, including maraschino cherry and freestone peach processing, will be moved next year to plant

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in Sunnyvale where recent additions will allow continuance of operations without construction of additional space. Sale of Niles plant makes complete Schuckl's move from Niles to Sunnyvale.

NORTHROP BUYS RADIOPLANE STOCK—Northrop Aircraft, Inc., Hawthorne, acquires 100% of stock of Radioplane Co., of Van Nuys, main U. S. manufacturer of radio-controlled target planes essential for training U. S. military personnel. Radioplane will continue its production of target aircraft, its research and development work as a division of Northrop Aircraft.

COLORADO

\$6,000,000 TRAIN EQUIPMENT—Colorado & Southern Lines plan on spending \$6,000,000 on new train equipment to include twenty diesel locomotives from General Motors Corp., 250 steel box cars, and 120 special type freight cars. Bids on cars will be sought. Equipment will go into service on joint lines of C. & S. and its subsidiary, Fort Worth & Denver Railway between Denver and Fort Worth-Dallas.

CO. SEEKS COAL PLANT SITE—Carbide & Carbon Chemicals Co., a division of Union Carbide & Carbon Corp., will explore possible sites for a coal hydrogenation plant to act as a key to Colorado's 300,000,000,000 tons of coal. If built, plant could run as high as \$200,000,000, but returns of \$6,000,000 to \$30,000,000 yearly would be made.

Colorado's coal region has been neglected because of its relatively poor grade of ore. However, with new methods of producing synthetic fuels from coal, as well as gasoline, oils, chemicals and drugs, lower grade of coal is now more easily rendered and processed to yield these by-products.

IDAHO

MINING FIRMS TO UNITE—Polaris Mining Co. and Silver Summit Mining Co., two outstanding silver-lead properties in Wallace district, agree to consolidate. Upon merging, Polaris will provide 96% working capital plus a surface plant and a mill. Silver Summit will contribute unexplored ground and a deep shaft strategically located to adjacent properties.

MONTANA

STATE POWER SYSTEM INCREASES—Since 1940, Montana Power Co. shows average residential electric rate drop from \$.0432 to \$.0252 per kilowatt-hour, a 42% decrease. During same period, company has invested \$56,053,466 in additional plant and properties. It now has two major projects: securing permits from U. S. and Canadian governments to authorize its importation of natural gas from Alberta; and construction of a third generating unit at Kerr hydroelectric plant near Polson to add 56,000 kilowatts to system's generating capacity.

NEVADA

AEC CONTRACT FOR UNIVERSITY—University of Nevada is awarded a \$60,000 contract by U. S. Atomic Energy Commission for developmental studies of methods for processing uranium ores and concentrates. University will study beneficiation (process of concentrating ores by physical methods) of low-grade uranium ores and extractive metallurgy for recovery of uranium and other values from ores and concentrates. Work will not involve construction of new facilities at university.

GAS PIPELINE PERMIT—Federal Power Commission grants a certificate of public convenience and necessity to Nevada Natural Gas Pipeline Co. of Las Vegas. Order authorizes construction and operation of facilities for transporting and selling 20,000,000 cu. ft. of natural gas daily. Gas will be purchased from El Paso Natural Gas Co. near Topock, Arizona, for transmission to southern Nevada. It will be transported through 114 miles of 10¾-in. pipeline costing \$2,319,140. Nevada Natural Gas hopes to have natural gas serving Las Vegas-Henderson area by midwinter.

FALLON MAY GET BATTERY PLANT—Robinson Co. of Blair, Neb., tentatively chooses Fallon as site for a battery reprocessing plant. Facility would receive and reprocess batteries from north-eastern California, southern Oregon and Idaho and part of Utah. Company would provide housing for some 30 steady employees.

NEW MEXICO

MALCO BUYS PREWITT REFINERY—Malco Refining Co. purchases Petroleum Refining Co. at Prewitt, 38 miles south-east of Gallup. Transaction includes refinery with 1,500 barrels daily capacity, 45 shallow producing wells in Hoshah Dome of McKinley County, and a 32-mile pipeline connecting refinery with Hoshah field. Malco intends to invest \$1,000,000 in Prewitt property within a year. This investment will include extension of present pipeline to newly-opened fields in western Rio Arriba County, storage expansion, installation of a catalytic reformer to manufacture high octane gasoline and installation of a thermal cracking unit for manufacturing gasoline from heavy oil by heat and pressure.

OREGON

DIAMOND BUYS SPRINGFIELD MILL—Diamond Lumber Co., Portland, purchases Springfield Mill Co.'s lumber mill at Springfield. H. F. Johnson, assistant to manager of Diamond's Tillamook operations, is named resident manager at Springfield plant.

MILL IN OFFING—Lucas Brothers, Oregon lumbermen, lease land in vicinity of Piercy for installation of a new steel and concrete sawmill to be built by Basil Thompson of Sutherlin. A mill pond,



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constructed behind mill will hold about 1,000,000 ft. of logs which will be bought on open market.

NEW MILL FOR MULTNOMAH PLYWOOD—Multnomah Plywood Corp., worker-owned company, breaks ground near Glendale in southern Oregon for a \$200,000 peeler mill. Mill, to employ 40 workers, will be in operation within four months. Veneer will be taken to Portland for pressing into plywood. Firm has working agreement with Robert Dollar Lumber Co. whereby plywood company will receive peeler logs and lumber company gets saw logs.

FIR BARK PROCESSING—State Board of Forestry signs agreement with M. W. Kellogg Co., Jersey City, N. J., covering Kurth bark extraction process developed in Oregon forest products laboratory on Oregon State College campus. Process permits recovery of wax, dihydroquercetin and tannin from Douglas fir bark, which is usually left littering Oregon's forests. Option agreement covers an 8-month investigative period, followed by an 18-month pilot plant stage, and then an exclusive production contract for a 5-year period.

NEW FABRIC DEVELOPED—Wahkeena Co., a subsidiary of Pendleton Woolen Mills, Portland, develops a washable fabric, one-half virgin wool, one-half Arizona Pima cotton, woven on same principle as woolen goods. New material, costing about as much as all wool will be introduced to consumer market in tailored shirts under trade name "Wahkeena."

WASHINGTON

SKAGIT STEEL GETS CONTRACTS—U. S. Navy awards \$1,250,000 worth of contracts to Skagit Steel & Iron Works, Sedro Wooley, for hoisting winches. Job, added to work at hand, will provide work for 400 men during remainder of year. Winches go to Bureau of Yards and Docks at Port Hueneme, Calif.

NEW POTLINE AT KAISER—Mead primary aluminum reduction plant of Kaiser Aluminum & Chemical Corp. becomes largest in country as plant's eighth potline is placed in production. This adds approximately 44,000,000 lb. of primary aluminum to production capacity, increasing plant's total capac-

ity to 350,000,000 lb. annually. Other additions to Mead plant's current \$12,500,000 expansion include a cryolite recovery plant, carbon baking furnace, carbon storage building, additions to its rectifier station, a metals storage building and a fume control system.

FIRM FORMS FOR CEDAR PRODUCTS—Newly organized Grays Harbor firm, Western Cedar Products, Inc., will produce pre-painted cedar siding and shakes in mill at end of Monroe St. in Hoquiam purchased from Acme Door Co.

NEW ROCKET LAUNCHING SHIP—IFS (inshore fire support ship), a new type rocket-launching ship for naval use is scheduled for construction at a

Puget Sound shipyard. Built along lines of conventional type fighting ship, IFS will have two diesels and a geared drive. It will be 245 ft. long, with 38 ft., 6 in. beam and 1,200 ton displacement.

WYOMING

TRI-STATE POWER POSSIBLE—REA associations in Nebraska, Colorado and Wyoming join to make study of power requirements of farms and rural areas which may result in a tri-state power plant. Installation would supply needed power not available from reclamation bureau plants.



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WESTERNERS AT WORK

California

Lockheed Aircraft Corp. names **B. C. MONESMITH** as vice president in charge of manufacturing.

L. T. SYLVESTER, president of **Mathews Conveyor Co.**, Ellwood City, Pa., and president and general manager of **Mathews Conveyor Co., Ltd.**, Port Hope, Ontario, is elected vice president of **Mathews Conveyor Co. West Coast**, San Carlos.

DONALD S. CAMPBELL is appointed technical representative for **AiResearch Manufacturing Co.**, Los Angeles, on assignment to joint advisory military assistance group (JAMAG) of Mutual Defense Assistance Pact. Campbell, who will headquarter in London, has been serving AiResearch as a field service engineer, covering military and commercial airline bases in this country.

New manager of contract division in **Standard Oil Co. of California's** producing department is **G. F. SCHROEDER**. He replaces **O. J. HAYNES**, who assumes new duties as vice president and director of **Richmond Petroleum Co.**, a subsidiary of Standard Oil Co. of California.

F. D. TUENMMLER, head of analytical standardization department, **Shell Development Co.**, Emeryville, Calif., is given an Award of

Merit by **American Society for Testing Materials**. Tuemmler's award is for significant and valued service, particularly in the work of Committee D-2 on petroleum products and lubricants, and in coordination of that work with other ASTM committees.

R. R. NEWMAYER is named general foreman of blast furnaces, **Kaiser Steel Corp.**, Fontana. Newmeyer joined Kaiser in 1942.

Western Gear Works appoints **HAROLD NIEMEYER** as assistant to area manager at Lynwood. **STAN COULTAS** is new supervisor of purchasing and production control.

J. D. ZELLERBACH, president of **Crown Zellerbach Corp.**, is decorated with the Star of Italian Solidarity, First Class, highest civilian award of the Italian government, in appreciation for the constructive work he did as administrator of ECA for two years in Italy.

E. L. BLACK is designated acting manager of **Pacific Airmotive Corp.'s** manufacturing division, following resignation of **RICHARD D. MAYSTEAD**, vice president. **CLYDE BISHOP** is appointed to newly created position of procurement and material control supervisor for PAC's aviation products division. **E. E. ADAMS**, former assistant production superintendent, is named general quality control manager.

PAUL DOLLARD, former president of **Daystrom Corp.**, is elected president of **Mission Appliance Corp.**, Los Angeles, succeeding **A. H. SUTTON**, retired.

Atlas-Pacific Engineering Co., Oakland, advances **J. R. RIORDAN** to general sales manager. **R. F. BLAKEWELL** is named vice president in charge of production, and **R. E. HOLL** is appointed vice president in charge of finances. New secretary-treasurer is **D. E. BRAINARD**.

Colorado

D. J. ROACH, executive vice president of **Great Western Sugar Co.**, retires after 44 years of service. **FRANK A. KEMP** is newly elected president and general manager, and **B. Z. OXNARD** is new vice president and general sales manager. **ROBERT J. FISHER** is

elected treasurer and assistant secretary; **C. W. DOHERTY**, secretary; **CALDWELL MARTIN**, general counsel; **M. B. HOLT**, general attorney; **LYMAN H. ANDREWS**, northern district manager; and **J. R. MASON**, southern district manager.

ROBERT W. HOPKINS is appointed terminal superintendent at Denver for **Union Pacific Railroad**, succeeding **C. E. BRENTENITZ**, who is transferred to Kansas City, Mo., as vice president-operations of **Kansas City Terminal Railway Co.** Hopkins was transportation assistant to vice president at Omaha prior to this promotion.

Montana

ROBERT E. DWYER, executive vice president, becomes president of **Anaconda Copper Mining Co.**, and its subsidiaries, succeeding



Dwyer




Steele



McGlone

WILLIAM HAROLD HOOVER, deceased. **CLYDE E. WEED**, vice president in charge of mining operations, takes over as vice president in



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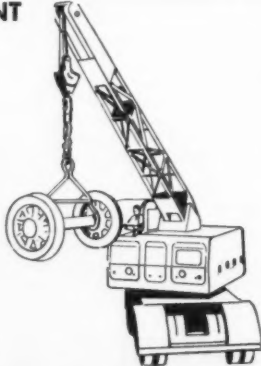
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charge of operations; EDWARD S. MCGLONE, vice president in charge of Western operations, is advanced to executive vice president; CHESTER H. STEELE, general manager of Western mining operations, succeeds McGlone. New Western general counsel for Anaconda is JAMES T. FINLEN.

J. E. CORETTE, vice president and assistant general manager of *Montana Power Co.*, is elected president and general manager, suc-



Corette

Bird

ceeding FRANK W. BIRD, who becomes chairman of the board. C. J. BURNS, assistant to vice president, is promoted to vice president.

ROBERT A. BLAKE, formerly superintendent of *American Smelting and Refining Co.'s* Mike Horse Mine at Mike Horse, is new mill superintendent at company's new 1,000-ton Van Stone zinc flotation plant in Stevens County, Wash. BRUCE CAMPBELL, formerly with *Day Mines, Inc.*, succeeds Blake.

Butte, Anaconda and Pacific Railway elects JOHN L. WHITE as assistant treasurer. LEO V. KELLY is company's new assistant secretary.

Nevada

LOUIS J. ARPIN is now full time ground instructor for *Bonanza Air Lines*, Las Vegas.

A. TODD DAVIS, industrial engineer for *Nevada Mines Division, Kennecott Copper Corp.*, McGill, is appointed assistant director of employee relations.

Oregon

Oregon State Air Pollution Authority names Richard E. Hatchard as director.

WILLIAM A. BINGHAM is elected vice president of *Coca-Cola Bottling Co. of Oregon*, succeeding HENRY D. KAHR, who assumes executive duties with *Coca-Cola Co.* on eastern seaboard.

Washington

WILLIS L. CAMPBELL, former vice president and treasurer of *General Insurance Co. of America*, Seattle, is named vice president and assistant to president of *Georgia-Pacific Plywood Co.*

Boeing Airplane Co. appoints RICHARD MORGAN as chief service engineer, succeeding ARO GONNELLA, who is new director of spares department. AMOS WOOD, former service liaison supervisor, succeeds Morgan, and HENRY RICHMOND is new service liaison supervisor.

FRED WELCH, Seattle, is appointed chief industrial engineer for *Simpson Logging Co.*

HARRY SCHRADER, JR., resigns as managing director of *Douglas Fir Plywood Association* to become executive vice president of *U. S. Plywood Corp.*, Seattle.

ASSOCIATIONS ELECT

Systems and Procedures Association of America, Los Angeles Chapter: President, ROBERT C. MADDOX, *Bohemian Distributing Co.*; vice president, D. Y. COLE, *Northrop Aircraft, Inc.*; secretary, GLENN C. TOBIAS, *General Petroleum Corp.*; treasurer, ROBERT S. WEBB, *Prudential Insurance Co.*

American Foundrymen's Society, Southern California Chapter: President, HAROLD G. PAGENKOPP, *Angelus Pattern Works*, Huntington Park; vice president, HUBERT CHAPPIE, *National Supply Co.*, Torrance; secretary, CHARLES GREGG, *Gregg Iron Foundry*, El Monte; treasurer, WILLIAM BAUD, *Mechanical Foundries Division, Food Machinery & Chemical Co.*

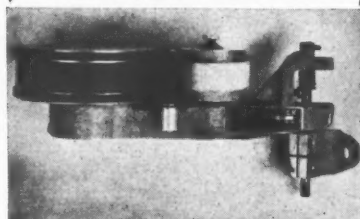
Pacific Coast Paper Box Manufacturers' Association: President, CHARLES H. WOESNER, *Boxcraft Paper Box Co.*, Oakland; vice president, ROY F. ELSTROM, *Eagle Paper Box Co.*, Tacoma, Wash.; treasurer, J. DWIGHT TUDOR, *The Flintkote Co.*, Los Angeles.

Coal Producers Association of Washington: President, HARRY PATRICK; vice president, FRED BIANCO; secretary, RALPH CLARK.

National Coal Association: Treasurer, JOHN L. KEMMERER, JR., president, *Kemmerer Coal Co.*, Wyoming.

Illuminating Engineering Society, South Pacific Coast Region: Regional vice president, LEONARD A. HOBBS, vice president in charge of sales and public relations, *Smoot-Holman Co.*, Inglewood.

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Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials

CHARLES E. DURHAM is manager of new steel warehousing and distributing facilities recently completed in Sacramento, Calif., by Kyle & Co., Central Valley steel distributor and fabricator. Branch operation is housed in a Kyle-made metal building on a 300 x 300-ft. site at 500 Richards Blvd., Sacramento 14. Telephone Gilbert 2-1978.



C. E. Durham

L. W. HARRIS retires as president of Ames Harris Neville Co., manufacturer of textile and paper bags, tents, tarpaulins and canvas specialties. He is succeeded in office by FLETCHER AMES. Ames Harris Neville Co. services entire Pacific Coast with plants in San Francisco, Berkeley, Los Angeles and Portland.

Wood Conversion Co., St. Paul, Minn., names J. M. GODLEY, Sr., manager of its Denver district. He will direct company sales activities for the Western area. Wood Conversion Co. makes wood insulation and interior finish products and a line of cellulose fiber felts for protective packaging, cushioning and sound and thermal insulation.

Air-Mac, Inc., of California opens for business as an exclusive distributor of Buda fork lift trucks for Southern California. Headquarters are at 5117 E. Washington Blvd., Los Angeles 22. WALTER TAYLOR, formerly connected with Buda Co. in Oregon, is manager of new firm. In addition to Buda fork lift trucks and tractors, Air-Mac,

Inc., will represent Gerlinger Carrier Co., maker of heavy duty fork trucks, in Arizona.

Nordberg Manufacturing Co., Milwaukee, Wis., makes territorial change in West Coast operations of its crusher and process machinery divisions. In this change, T. D. DAVIS, Western branch manager of crusher and process machinery divisions, takes charge of company's entire Pacific Coast operation including Northwest territory, formerly managed by G. E. JARPE who has transferred to Duluth, Minn., as district manager of north central territory. Davis will retain his headquarters at Nordberg Manufacturing Co.'s San Francisco office. J. W. CRANDALL and L. O. MAKHOLM will assist him. Makholm recently transferred from Milwaukee to San Francisco office.



Davis



Gilliland

The Swarthwout Co., Cleveland, Ohio, opens a district sales and service office for its power plant and autronic control divisions at 317 W. Main St., Alhambra, Calif., office, servicing Southern California, Arizona and Clark County, Nevada, will be managed by ROGER L. GILLILAND. CHARLES P. CROWLEY will continue to handle special power plant equipment accounts from 711 Gibbons St., Los Angeles 31, while agents for company's industrial ventilating division, Gil Moore & Co., will maintain offices at 714 W. Olympic Blvd., Los Angeles 5.

Utah Radio Products, Inc., Huntington, Ind., appoints George Davis Sales Co., Los Angeles, as its representative in Southern California and Arizona.

MELVIN S. DONALDSON, manager of San Francisco and Berkeley warehouses of A. M. Castle & Co., steel distributor, is elected vice president in charge of company's West Coast activities. HARRY CHRISTENSEN is appointed manager of warehouse in Los Angeles succeeding LEROY W. WESTERBECK, resigned.

Rust-Oleum Corp., Evanston, Ill., appoints Masek Auto Supply Co., Inc., as its new industrial distributor in Casper, Wyoming.

Northern California branch of Fasnir Bearing Co., New Britain, Conn., manufacturer of ball bearings and pillow blocks, moves from its old location at 434 Larkin St. to a new warehouse and sales office at 255 Loomis St., San Francisco.

S. C. OSBORN is named Los Angeles division manager of The Texas Co., to succeed W. L. MASSIE, retired. W. H. COTREL takes position of assistant division manager; W. K. FAULKNER is assistant division manager, sales; R. A. RIDDLE becomes assistant division manager, sales promotion; and B. C. SEDGWICK, former zone manager in Los Angeles, becomes state manager in Sacramento.

J. L. REID, field representative, mechanical goods, is appointed district manager of Goodyear Tire & Rubber Co.'s mechanical goods sales at Salt Lake City. He replaces W. T. ROBERTS, retired.

RHULE L. BELL is promoted from field engineer in Westinghouse Electric Corp.'s engineering and service department, to company's Pacific Coast industrial control engineer. His headquarters are in San Francisco.



Bell



MacCorkle

E. W. MACCORKLE, JR., assumes duties of vice president and manager of Air Reduction Pacific Co.'s Los Angeles district. He succeeds H. A. HOTH, who becomes vice president and manager of Air Reduction, Portland district.

Templeton, Kenly & Co., Chicago manufacturer of jacks, will be represented in far West by PHILLIP H. McMANUS who, in addition to his new position as vice president in charge of sales, will travel in Western states.

JACK A. COOPER, San Francisco, manufacturers' agent, will represent Aluminum Industries, Inc., Cincinnati, Ohio, on its line of aluminum paints and varnishes in Northern and Central California and in Western Nevada.

JAMES C. HUMPHRIES will act as sales representative in California, Washington and Oregon for Standard Pressed Steel Co., Jenkintown, Pa. His headquarters will be in Los Angeles. He will handle Standard Pressed Steel Co.'s lines of socket head and hollow

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Lufkin Foundry & Machine Co. expands its West Coast warehouse and service departments located at 5959 S. Alameda St., Los Angeles.

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ROLLE RAND, general manager of the Greater Wyoming Committee, and director of Industrial Division of Wyoming Commerce and Industry Commission, resigned August 1.



Rand



Deatrick

ALBERT L. DEATRICK is appointed manager of sales department of Magna Mill Products, heavy-milling precision machine shop in South Gate, Calif.

Electric Motor Co., 231 Imperial Ave., Calexico, Calif., is newly named distributor in Pacific area for Allis-Chalmers Manufacturing Co.'s general machinery division. Company will handle Allis-Chalmers motors, controls, Texrope drive equipment, pumps and transformers in Imperial County.

FRED C. SCHULZ is made Pacific Coast manager of B. F. Goodrich Co.'s associated

lines division. Schulz, succeeding K. K. KANTZER, deceased, will headquarter at B. F. Goodrich's Los Angeles plant. In his new assignment, Schulz is responsible for sales and merchandising of tires, tubes and automotive accessories over eleven Western states.

The Kaynar Co., Los Angeles, appoints FRANK R. LEWIS sales manager of its aircraft parts division. He will supervise both national and export sales of company's lightweight, self-locking nuts and fasteners.



Balthis

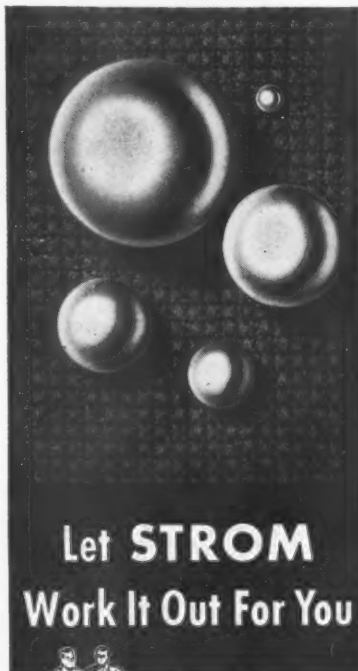


Lewis

Heat and Control, Inc., industrial process heat engineer, 270 Seventh St., San Francisco, opens a southern division office at 1671 E. Colorado St., Pasadena, Calif. (Telephone Ryan 1-9055). B. DOUGLASS BALTHIS, JR., takes charge of new division. Heat and Control, Inc., is appointed West Coast representative for Askania Regulator Co. of Chicago and for Bloom Engineering Co. of Pittsburgh, supplementing its industrial furnace

... Continued on page 171

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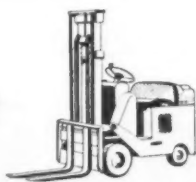
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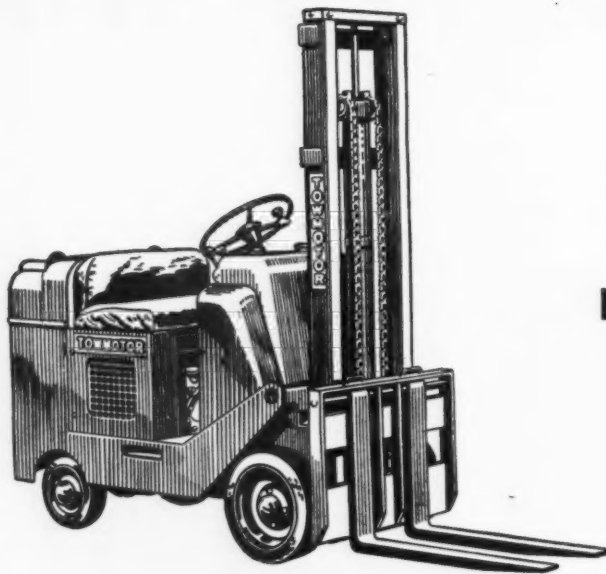
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AIR for INDUSTRY

San Francisco Stock

JOY WG-9 Single cyl. Upright, 11 x 9—443 cf. displacement, 320 cf. actual air. Less Power. Required 75 hp.

JOY WL-80E—Two Stage Unitair—295 cf. displacement, 230 cf. actual air—powered with Reliance 50-hp. Motor 220/440—3ph/60 cy.

BOTH READY TO GO

COAST EQUIPMENT COMPANY

444 Eighth St. San Francisco, Calif.
MA 1-5740

G.M.C., Cab Over, Refrigerated truck, 1 1/2 ton. Good condition. Good tires. New engine. 1 Ford 1 1/2 ton refrigerated truck. Good condition. Nearly new engine. Good tires. Both can be used for frozen food. Both zero temperature.
715 PLUMAS STREET YUBA CITY, CALIF.
Phone 2-2463

INDUSTRIAL PROPERTIES

FOR SALE

Established Business In Sacramento

With accounts throughout Northern California, grossing \$59,000 per month. One of the finest machine shops and welding plants in Northern California. Manufactures and distributes industrial and agricultural equipment. Exclusive distributors for Dodge Manufacturing Company, Chain Belt Company, General Electric Company, Reeves Pulley Company, and others. Owner must sell because of poor health. Excellent opportunity.

BOX 63, WESTERN INDUSTRY
609 Mission Street, San Francisco 5, Calif.

For Lease—WAREHOUSE and OPEN PARKING AREA
Warehouse with 6,000 ft. floor space, adjoining by a 8" concrete floor slab of 10,000 square feet plus parking lot 125'x300'. 185' of R.R. spur in rear. 185' frontage on paved highway. Can offer long term lease.
KEN COLIN, Builder
28 Halsey Ave. Phone 2-2219 Petaluma, Calif.

(Continued from page 169)

and oven design and construction and its industrial electric heat activity.

Keystone Steel & Wire Co., Peoria, Ill., transfers R. M. BARRICK, formerly Keystone representative in Kansas-Oklahoma area, to West Texas-New Mexico territory. He succeeds F. C. McKNIGHT, deceased.

Pacific Wire Works Co., Seattle, forms Kaye Pacific Wire Products Co. as a California division, and establishes a sales branch and warehouse at 5340 E. Harbor St., Los Angeles. New company has acquired John A. Roebing's Son's Co. woven wire fabric division's stock of insect screen cloth, hardware cloth and industrial wire cloth to be augmented for maintaining a stock from which California requirements will be met.



MATERIAL HANDLING EQUIPMENT

Lift Trucks • Hand Trucks • Conveyors
Hoists & Cranes
Casters & Wheels

IRVING G. KING & CO. ★ SINCE
821 MATEO ST. L. A. 21 1930

NAME PLATES

ETCHING COMPANY OF AMERICA
55 New Montgomery Street
DOuglas 2-8434 San Francisco, Calif.

FOR SALE

We are changing to 40 x 60" Carrier and Lift Truck package and have the following 54 x 54" equipment for sale:

Two Series 70 Model 4657 Ross Straddle Carriers 54 x 54", each with operator's cab and steering wheel guards and F6209 Continental motor; and two Model 16 HT Ross Lift Trucks with 24" Lift, 54" forks, adjustable side-shifting carriage, operators guard, with all standard equipment otherwise added.

Machines in splendid shape—now being used regularly, available because of our switching of stacking package standards.

HUSS LUMBER COMPANY

2301 N. Racine Ave., Chicago 14, Illinois

FOR SALE:

1—Model SHA Triangle Automatic Power Feed Net Weigher, new, never used, complete with material feed hopper, dust hood, and 1/2 HP AC 110/220 volt GE Cap. motor, \$800.00 FOB, California. New factory cost \$1090. FOB Chicago.

Address BOX 61,
WESTERN INDUSTRY

609 Mission Street, San Francisco 5, Calif.

Immediate Shipment
of D. O. Rated Orders

STAINLESS STEEL

ARC WELDING ELECTRODES

- Coiled, Copper-Coated Automatic Welding Electrodes
- All Sizes Welding Cable
- AC & DC Welding Machines

BLUEWELD, INC.

Milwaukee 3, Wisconsin

AL WHITTAKER, formerly Pacific Coast manager of Roebing's woven wire fabric division, is now California manager of Kaye Pacific Wire Products Co.

PRESSURE VESSELS Immediately Available

- 8—10' ID dia. x 40' x 3" shell. Heads 3 1/2". Test Pressure 900 psi. WP 600 psi.
- 5—10' ID dia. x 40' x 2 1/2" shell. Heads 3". Test Pressure 750 psi. WP 500 psi.
- 8—8' ID dia. x 40' x 2" shell. Heads 2 1/4". Test Pressure 750 psi. WP 500 psi.
- 1—6' ID dia. x 40' x 2" shell. Heads 2 1/4". Test Pressure 750 psi. WP 500 psi.

All used, good condition, seam to seam, welded code construction. Built by A. O. Smith Corp. Located near Chicago, Ill. Prints, prices available on request.

Wire - Phone - Write

KINSLOW POWER & EQUIPMENT CO.

817 So. Boulder, Tulsa, Okla. Phone 5-5914

Let WESTERN INDUSTRY

Help Sell Your

SURPLUS EQUIPMENT!

Have you any used or rebuilt equipment for sale or rent? Western Industry offers you many potential outlets at a good profit and little cost.

See rates at top of page . . . Send in your list now, specifying size of ad you want—we'll do the rest. Write today to . . .

CLASSIFIED AD. DEPT.

Western Industry,
609 Mission St., S. F. 5, Calif.

100 GENUINE 8 x 10 PHOTOS 10^c ea

24 HOUR SERVICE!

FREE DELIVERY ANYWHERE

MADE DIRECT FROM 50 8 x 10 13c ea.
PHOTOS (OR NEGATIVES) 500 8 x 10 8c ea.

1000 8 x 10 GLOSSIES 7^c EACH

POSTCARDS

5000 \$21 2^{1c} each in 1000 lots PER M. 22

SAVE THROUGH QUANTITY PRODUCTION

FOR COMPLETE PRICE INFORMATION

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GRanite 6179

Q QUANTITY PHOTOS, Inc.

5509 SUNSET BLVD., HOLLYWOOD 28, CALIF.
LARGEST PHOTO REPRODUCTION PLANT IN WEST

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Johnston Stainless Welding Rods

Practical, Down-to-Earth Welding Rods
Alloys as they are supposed to be

Corrosion Resistant—
Clean metal

Strong—
Low in cracking

A. P. JOHNSTON CO.
1845 E. 57th St., Los Angeles 58



Something New IN CRANE DESIGN



modern functional **SPANMASTER CRANES**

GET THE PLUS VALUES and extra quality of SpanMaster Cranes . . . the first new crane development in 25 years.

SpanMaster Cranes incorporate an entirely new in-line suspension principle and a new flexible Mono-yoke load bar system. Every feature from the heat-treated nickel-chrome alloy wheels with precision ball bearings to the smooth starting motor drive is designed for its functional qualities.

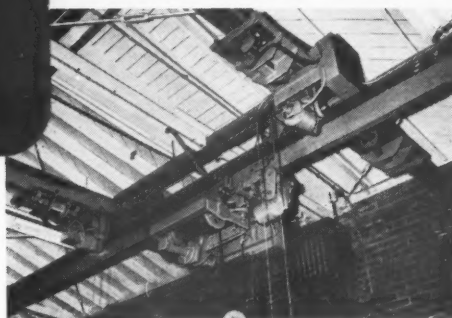
SpanMaster underslung Cranes are built in standard models to 10 tons capacity; SpanMaster top riding Cranes in standard single girder to 10 tons; double girder to 25 tons.

With SpanMaster Cranes you get greater efficiency of operation, longer life and low maintenance cost. Write for catalog and compare features and advantages.

Distributorships are being established now in the principal cities of the West. Inquiries from qualified distributors in the territory will receive prompt attention.

SPANMASTER CRANE CORP.
of America

10727 S. Garfield Ave.
South Gate, Calif.



Two mating SpanMaster cranes showing the hoist on the transfer bridge.



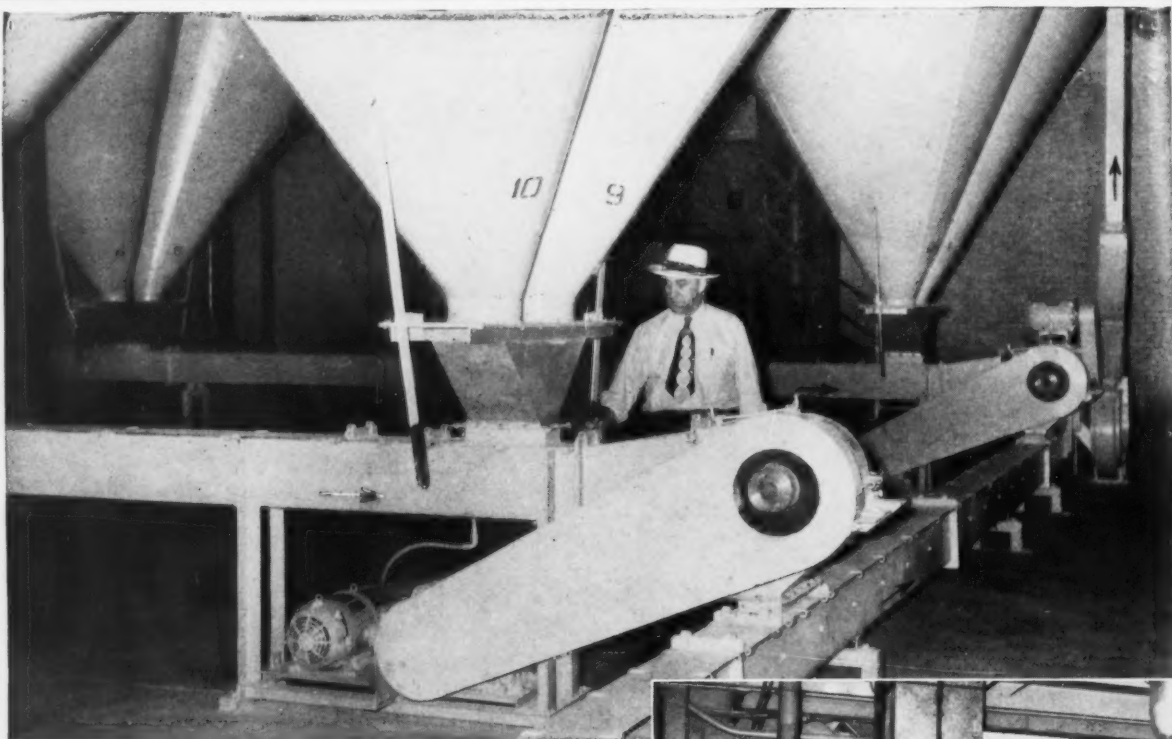
Typical installations such as these have been made for many national concerns. Names furnished on request.



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San Francisco 5, Calif.

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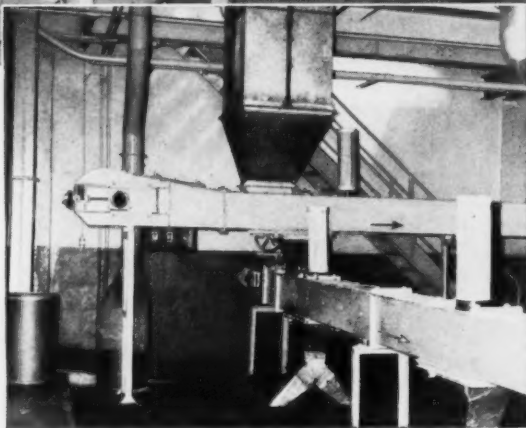


Handling Grains Untouched by Hands



In the brewing of fine beer, it is essential that the ripe, choice grains be so "handled" as to protect them from any contamination. At the Theo. Hamm Brewing Company, St. Paul, Minnesota—where absolute cleanliness is a "must"—eleven S-A REDLER conveyors and one REDLER loop-boot type elevator are employed for storing, reclaiming and handling grains in the brewhouse. The sealed REDLER casings prevent contamination of grains during handling and prevent loss by spillage. The compactness of the system permits operation in close quarters where floor space is valuable and headroom restricted.

S-A Engineers have designed bulk handling systems for 50 years which combine all types of conveyors, elevators and accessory equipment. If you have a bulk materials handling problem, it will pay you to consult with S-A Engineers. Write today—without obligation.



THEO. HAMM BREWING CO. ST. PAUL, MINN.

Grains are elevated to the top floor of the brewhouse where a horizontal REDLER conveyor receives and delivers them to three cross conveyors which discharge through multiple, gate-controlled chutes to 18 storage bins at an average rate of 25 tons per hour. Another series of horizontal REDLER conveyors underneath the storage bins reclaim from the bins and deliver to a collecting cross conveyor which feeds to the loop-boot feed section of a 64-foot high REDLER elevator. Grains are elevated to still another REDLER horizontal conveyor which moves them to a scale tank. This distributes through a 2-way chute to two horizontal-inclined REDLERs which convey grains to mash cookers.

151 Mission St., San Francisco 5, Calif.
1007 E. Burnside St., Portland 14, Ore.

STEPHEN S-ADAMSON
2227 E. 37th STREET, MFG. CO. LOS ANGELES 58, CALIF.

Bulk Material Handling Equipment

Washington Machinery & Storage Co.
7329 E. Marginal Way, Seattle 8, Wash.

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